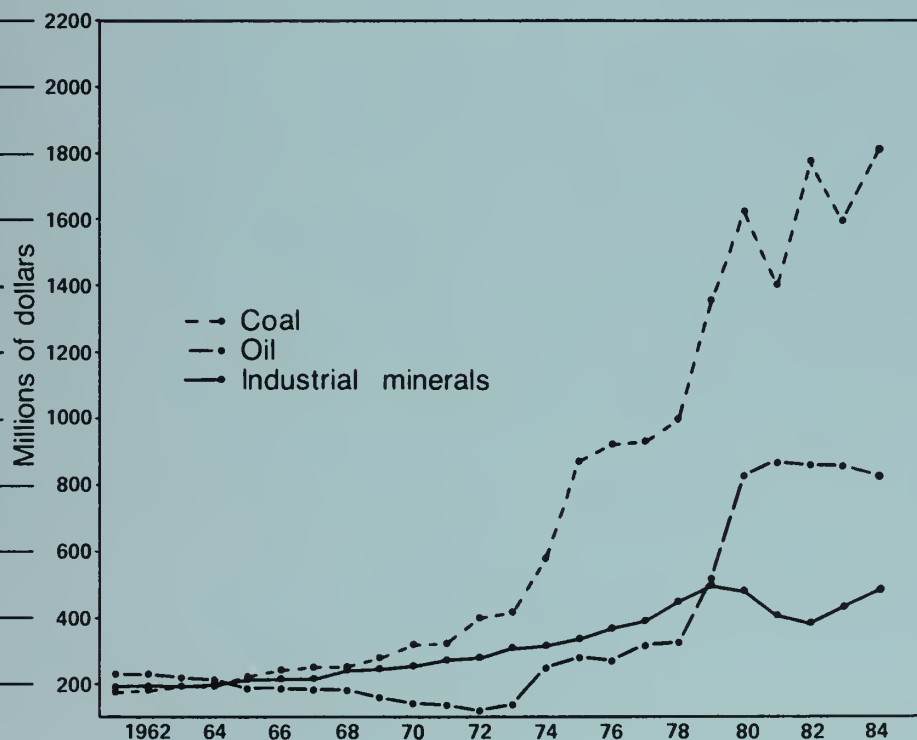
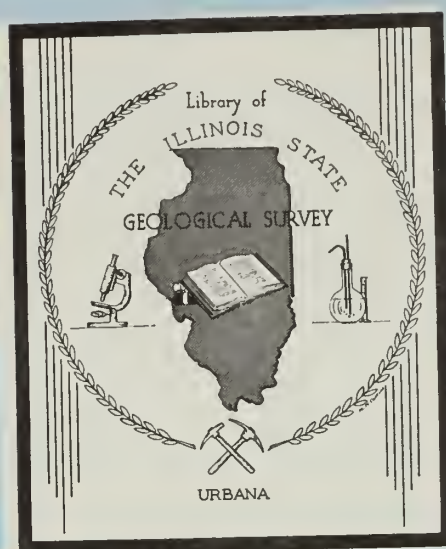


ILLINOIS MINERAL INDUSTRY IN 1981-83 and review of preliminary mineral production data for 1984

Irma E. Samson and Subhash B. Bhagwat

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and review of preliminary mineral production data for 1984

Irma E. Samson and Subhash B. Bhagwat

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ABSTRACT

The output and value of minerals mined, processed, and manufactured into products in Illinois are summarized in this report for 1981–83. Materials used in manufacturing were not necessarily extracted within the state.

Mineral materials	Production values (\$ million)		
	1981	1983	1984
Mined	2,665.0	2,935.6	2,865.5
Processed	988.5	508.5	577.9
Manufactured	167.6	192.4	173.5
Total	3,845.9	3,611.7	3,616.9

Coal continued to be the leading commodity in terms of value. Oil ranked second; stone, third; sand and gravel, fourth; and fluorspar, fifth.

In value of nonfuel mineral production, Illinois ranked nineteenth nationally in 1983, eighteenth in 1982, and

nineteenth in 1981. For all 3 years, Illinois remained the leading U.S. producer of fluorspar, tripoli, and industrial sand; it ranked fourth in stone, peat, and fuller's earth, and fifth in sand and gravel.

Preliminary data for 1984 indicate that the value of minerals mined was \$3,046.8 million, an increase from the \$2,865.5 million in 1983.

Detailed production summaries and analyses—including maps, tables, and graphs—for all mineral commodities are based on data available for 1981–83.

OVERVIEW

The mineral industry of Illinois includes three types of operations:

- removal of mineral materials from the ground by mining or other means of extraction,
- processing of crude mineral materials (mined primarily outside Illinois) into raw materials for industry,
- manufacture of mineral products such as coke, lime, and cement from mineral materials extracted and processed primarily in Illinois (fig. 1).

In 1983, the total value of products from the three types of operations was \$3,616.9 million, a 0.1 percent increase over 1982 (table 1). The true value is actually higher. Data are unavailable for some commodities, thus their values cannot be calculated. Table 2 presents production data for each commodity; the quantity and value of each is also shown as a percentage of the total national output in 1981, 1982, and 1983.

MINERAL MATERIALS MINED

In 1983, the value of commodities mined in Illinois decreased by 2.4 percent to \$2,865.5 million; whereas in 1983, it increased 10.2 percent over 1981 (table 1). Mineral fuels such as coal, crude oil, and natural gas account for 89.6 percent of the 1983 totals; industrial and construction materials such as clay, fluorspar, sand and gravel, stone, and tripoli account for 10.3 percent; and metals such as lead, zinc, and silver, as well as other minerals such as peat, barite, and gemstones, account for the remaining 0.1 percent.

In 1982, 99 of the 102 counties in Illinois reported extraction of mineral materials (table 3). Perry County, which produces coal and crude oil, continued to rank first in terms of production value: 11.3 percent of the state's total. Randolph County, which produces coal, crude oil, stone, sand, and natural gas, ranked second with 6.3 percent of the state's total.

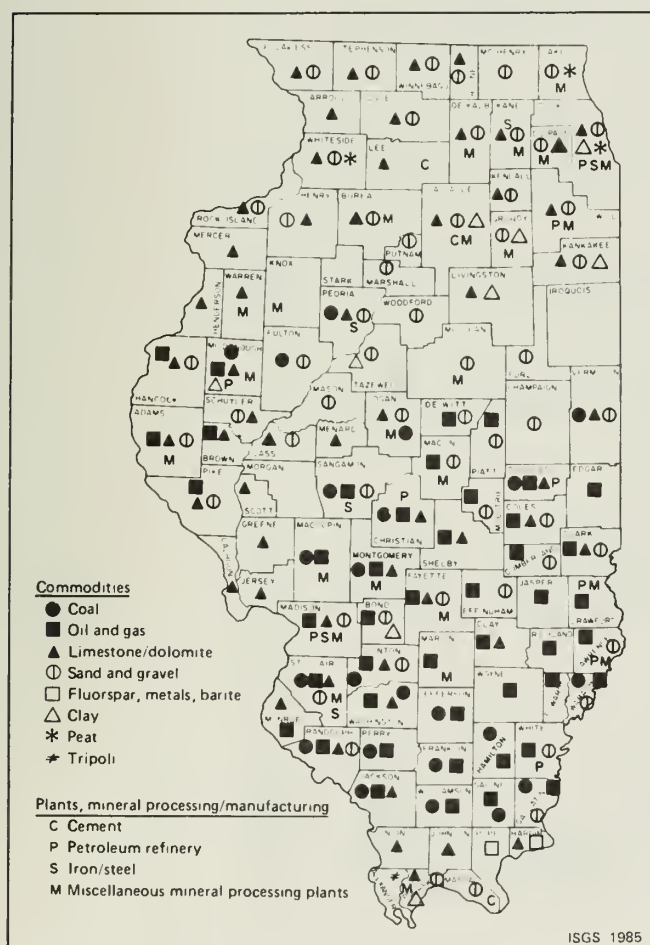


Figure 1 Illinois mineral production and mineral processing plants.

TABLE 1. Production and value of mineral materials mined and/or processed and mineral products manufactured, 1981-83^a

		1981			1982			1983		
Commodity	Unit	Quantity	Value (\$1000)	Average unit value (\$)	Quantity	Value (\$1000)	Average unit value (\$)	Quantity	Value (\$1000)	Average unit value (\$)
MINERAL MATERIALS MINED										
FUELS										
Coal	thousand tons	51,799	\$1,424,463	\$ 27.50	61,428	1,771,588	\$ 28.84	58,374	\$1,714,432	\$ 29.37
Crude oil	thousand bbl	25,490	918,147	36.02	27,709	878,101	31.69	29,200	849,137	29.08
Natural gas	million cu ft	1,295	3,199	2.47	1,162	3,043	2.62	1,030	2,926	2.84
Natural gas liquids	million bbl	NA	NA	NA	NA	NA	NA	NA	NA	NA
TOTAL ^b			\$2,345,809			\$2,652,732			\$2,566,495	
INDUSTRIAL AND CONSTRUCTION MATERIALS										
Clays - common	thousand tons	322 ^C	1,540 ^C	4.31	455 ^C	2,305 ^C	4.89	717	3,360	4.68
Refractory	thousand tons	C	C	11.41	C	C	12.54	-	-	-
Absorbent	thousand tons	W	W	47.77	W	W	49.73	W	W	51.12
Fluorspar (shipments)	thousand tons	W	W	165.10	W	W	174.50	W	W	171.53
Sand and gravel	thousand tons	25,150	68,970	2.74	21,557	59,148	2.74	21,100	58,400	2.77
Common industrial	thousand tons	4,646	49,186	10.59	3,989	45,665	11.45	4,060	42,871	10.94
Stone (limestone & dolomite)	thousand tons									
Crushed and broken	thousand tons	44,159	165,218	3.74	42,900	148,300	3.46	42,761	166,860	3.90
Dimension	thousand tons	1,712	85	49.86	2,000	98	49.00	1,836	71	38.53
Tripoli	thousand tons	W	W	W	W	W	W	W	W	W
TOTAL ^b			\$ 284,999			\$ 255,516			\$ 271,562	
METALS										
Lead	metric tons	W	W	W	W	W	W	W	W	W
Zinc	metric tons	W	W	W	W	W	W	W	W	W
Silver	troy oz	W	W	W	W	W	W	W	W	W
Germanium		NA	NA	NA	NA	NA	NA	NA	NA	NA
TOTAL ^b			W			W			W	
OTHERS										
Peat	thousand tons	46	1,502	32.77	W	W	W	W	W	W
Gem stones	thousand tons	NA	15	-	NA	15	-	NA	15	NA
Barite, primary	thousand tons	W	W	W	W	W	W	W	W	W
TOTAL ^b			\$ 1,517			\$ 15			\$ 15	
Values that cannot be disclosed (W)										
			32,724			27,374			27,471	
Total value of mineral materials mined ^b			\$2,665,049			\$2,935,637			\$2,865,543	

TABLE 1. (continued)

Commodity	Unit	1981			1982			1983		
		Quantity	Value (\$1000)	Average unit value (\$)	Quantity	Value (\$1000)	Average unit value (\$)	Quantity	Value (\$1000)	Average unit value (\$)
MINERAL MATERIALS PROCESSED										
Natural gas liquids	thousand bbl	NA	NA	NA	NA	NA	NA	NA	NA	NA
Perlite, expanded	short tons	43,085	7,591	176.19	W	W	166.31	W	W	W
Barite, ground	short tons	NA	NA	NA	NA	NA	NA	NA	NA	NA
Gypsum, calcined	short tons	W	W	W	W	W	W	W	W	W
Vermiculite, exfoliated	short tons	W	W	W	W	W	W	W	W	W
Iron oxide pigments	short tons	35,608	26,028	NA	31,000	29,300	NA	32,619	33,328	NA
Bismuth	tons	NA	NA	NA	NA	NA	NA	NA	NA	NA
Primary slab zinc	tons	NA	NA	NA	NA	NA	NA	NA	NA	NA
Secondary slab zinc	tons	NA	NA	NA	NA	NA	NA	NA	NA	NA
Columbium & tantalum	tons	NA	NA	NA	NA	NA	NA	NA	NA	NA
Iodine, crude	lbs	W	NA	NA	NA	NA	W	NA	NA	NA
Pig iron	thousand tons	4,503	928,687	206.22	2,261	449,475	198.79	2,754	512,072	185.91
Sulfur	thousand tons	216	19,739	91.20	214	21,006	98.04	W	W	W
Slag (iron & steel)	thousand tons	NA	NA	NA	NA	NA	NA	NA	NA	NA
TOTAL ^b			\$ 982,045			\$ 499,781			\$ 545,400	
Values that cannot be disclosed (W)			6,474			8,766			32,473	
Total value of mineral materials processed ^b			\$ 988,519			\$ 508,547			577,873	
MINERAL PRODUCTS MANUFACTURED										
Cement (shipments)	thousand tons	1,574	61,536	39.10	1,757	78,444	44.64	1,857	74,975	40.37
Portland	thousand tons	W	W	W	W	W	W	W	W	W
Masonry	thousand tons	W	80,683	W	W	57,144	W	W	60,996	W
Clay products, estimated	thousand tons	W	W	W	W	W	W	W	W	W
Lime	thousand tons	1,170	NA	NA	1,175	NA	NA	1,155	NA	NA
Coke	thousand tons	NA	NA	NA	NA	NA	NA	NA	NA	NA
Glass	thousand tons	NA	NA	NA	NA	NA	NA	NA	NA	NA
TOTAL ^a			\$ 142,219			\$ 135,588			\$ 135,971	
Values that cannot be disclosed (W)			50,161			31,963			37,500	
Total value of mineral products manufactured ^b			\$ 192,380			\$ 167,551			173,471	
STATE TOTAL ^b			\$3,845,948			\$3,611,735			\$3,616,887	

^a Sources: U.S. Bureau of Mines, Illinois Department of Mines and Minerals, Illinois State Geological Survey.

^b Data may not add up to totals shown because of independent rounding.

Creffractory clay is included with common clay to avoid disclosing confidential data from individual companies.

NA = not available.

W = withheld to avoid disclosing confidential data from individual companies.

TABLE 2. Illinois mineral production, its value and percentage of United States mineral production, 1981-83^a

1981							
Commodity	Unit	Illinois		United States		Illinois % of U.S. production	
		Quantity	Value (\$1,000)	Quantity	Value (\$1,000)	Quantity	Value
Fluorspar shipments	thousand tons	W	W	115	18,412	--	--
Peat, commercial sales	"	45	1,502	757	18,784	5.94	8.00
Coal	"	51,799	1,424,463	815,244	21,522,442	6.35	6.62
Pig iron	"	4,503	928,687	73,755	15,094,698	6.11	6.15
Stone (includes dimension stone)	"	45,871	165,303	874,330	3,275,683	5.25	5.05
Sand and gravel	"	29,796	118,156	754,800	2,287,044	3.95	5.17
Coke	"	1,170	NA	42,786	4,826,261	2.73	--
Clays ^b	"	322	1,540	42,923	978,000	0.75	0.16
Zinc	"	W	W	312	306,879	--	--
Cement shipments (portland)	"	1,574	61,536	68,197	3,515,600	2.31	1.75
Lead	"	W	W	446	340,000	--	--
Crude oil	thousand bbls	25,490	918,147	3,128,624	99,396,384	0.81	0.92
Natural gas liquids	"	NA	NA	741,000	NA	--	--
Natural gas	million cu ft	1,295	3,199	19,955,823	39,512,530	0.01	0.01
Lime	thousand tons	W	W	18,856	884,158	--	--
1982							
Fluorspar shipments	thousand tons	W	W	74	13,000	--	--
Peat, commercial sales	"	W	W	800	20,000	--	--
Coal	"	61,428	1,771,588	832,524	22,686,279	7.38	7.81
Pig iron	"	2,261	449,475	43,300	9,222,900	5.22	4.87
Stone (includes dimension stone)	"	44,900	148,398	801,350	3,105,800	5.60	4.79
Sand and gravel	"	25,547	104,813	655,000	2,030,500	3.90	5.16
Coke	"	1,175	NA	28,115	3,220,001	4.18	--
Clays ^b	"	455	2,305	35,310	800,000	1.29	0.29
Zinc	"	W	W	300	254,668	--	--
Cement shipments (portland)	"	1,757	78,444	61,080	3,084,439	2.88	2.54
Lead	"	W	W	512	292,000	--	--
Crude oil	thousand bbls	27,709	878,101	3,156,715	90,029,512	0.88	0.98
Natural gas liquids	"	NA	NA	721,000	NA	--	--
Natural gas	million cu ft	1,162	3,043	18,519,675	45,558,401	0.01	0.01
Lime	thousand tons	W	W	14,075	696,150	--	--
1983							
Fluorspar shipments	thousand tons	W	W	61,000	10,000	--	--
Peat, commercial sales	"	W	W	700 ^c	16,030 ^c	--	--
Coal	"	58,374	1,714,432	776,635	20,176,977	7.52	8.50
Pig iron	"	2,754	512,072	48,770	10,388,010	5.65	4.93
Stone (includes dimension stone)	"	44,597	166,931	862,700	3,337,000	5.17	5.00
Sand and gravel	"	25,160	101,271	681,720	2,270,200	3.69	4.46
Coke	"	1,359	NA	25,808	2,938,757	5.27	--
Clays ^a	"	717	3,360	40,983	931,340	1.75	0.36
Zinc	"	W	W	275	251,204	--	--
Cement shipments (portland)	"	1,857	74,975	67,183	3,315,690	2.76	2.26
Lead	"	W	W	449	214,623	--	--
Crude oil	thousand bbls	29,200	846,800	3,170,999	NA	0.92	--
Natural gas liquids	"	NA	NA	NA	NA	--	--
Natural gas	million cu.ft.	1,030	2,926	16,822,144	43,614,369	0.01	0.01
Lime	thousand tons	W	W	14,902	761,496	--	--

^aSources: U.S. Bureau of Mines, Illinois State Geological Survey, Illinois Department of Mines and Minerals and American Petroleum Institute.

^bexcluding fuller's earth.

^cestimated.

NA = not available.

W = withheld to avoid disclosing confidential data from individual companies.

TABLE 3. Value of mineral materials mined and/or processed and mineral products manufactured in Illinois, 1982, by county^a

County	Approximate ^b rank bases on total value	Mineral materials mined, in order of value	Value (\$1000)	Mineral materials processed, in order of value	Value (\$1000)	Mineral products manufactured, in order of value	Value (\$1000)	Total value (\$1000)
Adams	39	Stone, sand & gravel, crude oil	W	Iron oxide pigments	W	--	--	W
Alexander	57	Tripoli	W	--	--	--	--	W
Bond	69	Crude oil, sand & gravel, clay, natural gas	W	--	--	--	--	W
Boone	88	Stone, sand & gravel	W	--	--	--	--	W
Brown	41	Crude oil, stone	12,800	--	--	--	--	12,800
Bureau	86	Sand & gravel, stone	568	--	--	Clay products	W	W
Calhoun	95	Stone	86	--	--	--	--	86
Carroll	85	Stone	748	--	--	--	--	748
Cass	92	Stone, sand & gravel	228	--	--	--	--	228
Champaign	79	Sand & gravel	1,422	--	--	--	--	1,422
Christian	30	Coal, crude oil, stone	W	--	--	--	--	W
Clark	61	Stone, sand & gravel crude oil ^c	W	--	--	--	--	W
Clay	25	Crude oil, stone	W	--	--	--	--	W
Clinton	12	Coal, crude oil, sand & gravel, stone	W	--	--	--	--	W
Coles	49	Crude oil, stone, natural gas, sand & gravel	W	--	--	--	--	W
Cook	11	Stone, sand & gravel clay, peat	W	Expanded perlite, sulfur, slag, pig iron ^d , secondary slab zinc ^e , bismuth ^e	W	Lime, clay products, coke ^e	W	99,625
Crawford	24	Crude oil	51,165	Sulfur	W	--	--	W
Cumberland	43	Crude oil ^c , sand & gravel	11,378	--	--	--	--	11,378
De Kalb	74	Stone, sand & gravel	W	Exfoliated vermiculite, expanded perlite	W	--	--	1,764
De Witt	65	Crude oil, sand & gravel	2,334	--	--	--	--	2,334
Oouglas	23	Coal, stone, crude oil	W	Natural gas liquids ^e	W	--	--	W
Ou Page	52	Sand & gravel, stone	W	Exfoliated vermiculite	W	Glass ^e	--	W
Edgar	62	Crude oil, natural gas	2,477	--	--	--	--	2,477
Edwards	28	Crude oil, natural gas	39,134	--	--	--	--	39,134
Effingham	45	Crude oil, sand, natural gas	W	--	--	--	--	W
Fayette	21	Crude oil, stone, sand & gravel, natural gas	W	Sulfur	W	--	--	W
Ford	89	Sand & gravel	W	--	--	--	--	W
Franklin	2	Coal, crude oil	197,241	--	--	--	--	197,241
Fulton	18	Coal, sand & gravel	W	--	--	--	--	W
Gallatin	22	Coal, crude oil, sand & gravel, natural gas	W	--	--	--	--	W
Greene	84	Stone	W	--	--	--	--	W
Grundy	59	Sand, clay	W	--	--	Clay products	W	4,002
Hamilton	29	Crude oil, coal	37,480	--	--	--	--	37,480
Hancock	78	Stone, sand & gravel, crude oil	W	--	--	--	--	W
Hardin	35	Fluorspar, stone, zinc, primary barite, lead, silver, gemstones, germanium ^e	W	Ground & crushed barite ^e	--	--	--	W
Henderson	83	Stone	W	--	--	--	--	W
Henry	71	Stone, sand & gravel	W	--	--	--	--	W
Iroquois	100	--	--	--	--	--	--	--
Jackson	14	Coal, stone, crude oil	W	--	--	--	--	--
Jasper	33	Crude oil	27,398	--	--	--	--	27,398
Jefferson	4	Coal, crude oil	158,429	--	--	--	--	158,429
Jersey	93	Stone	W	--	--	--	--	W
Jo Daviess	81	Stone, sand & gravel	1,157	--	--	--	--	1,157
Johnson	75	Stone	W	--	--	--	--	W
Kane	34	Sand & gravel, stone ^f	16,672	Iron oxide pigments	W	Clay products	W	W
Kankakee	56	Stone, clay, sand	W	--	--	--	--	W
Kendall	80	Stone, sand & gravel	W	--	--	--	--	W
Knox	44	--	--	--	--	Clay products	W	W
Lake	48	Sand & gravel, peat	W	Calcined gypsum, crude iodine ^e , columbium ^e	W	Clay products	W	8,321
La Salle	15	Sand & gravel, stone clay	48,590	--	--	Portland cement, clay products, glass ^e	W	W
Lawrence	16	Crude oil, sand & gravel	W	Sulfur	--	--	--	W
Lee	47	Stone	2,962	--	--	Portland cement, masonry cement	W	W
Livingston	50	Stone, clay	W	--	--	--	--	W
Logan	55	Coal, stone, sand & gravel	W	--	--	Glass ^e	--	W
McDonough	38	Coal, crude oil, stone clay	W	--	--	Clay products	W	W
McHenry	46	Sand & gravel	9,663	--	--	--	--	9,663

TABLE 3. continued

County	Approximate ^b rank bases on total value	Mineral materials mined, in order of value	Value (\$1000)	Mineral materials processed, in order of value	Value (\$1000)	Mineral products manufactured, in order of value	Value (\$1000)	Total value (\$1000)
McLean	64	Sand & gravel	2,441	--	--	Fiberglass ^e	--	2,441
Macon	42	Crude oil, sand & gravel	W	--	--	Glass ^e	--	W
Macoupin	6	Coal, crude oil	113,042	Exfoliated vermiculite	W	--	--	W
Madison	36	Crude oil, stone, sand & gravel, nat. gas	W	Sulfur, slag ^e , pig iron ^d	W	Clay products, coke ^e , glass ^e	W	16,445
Marion	13	Crude oil	85,489	Secondary slab zinc ^d	--	Glass ^e	--	85,489
Marshall	76	Sand & gravel	W	--	--	--	--	W
Mason	98	Sand & gravel	W	--	--	--	--	W
Massac	26	Sand & gravel	37	--	--	Portland cement	W	W
Menard	72	Stone	W	--	--	--	--	W
Mercer	94	Stone	109	--	--	--	--	109
Monroe	73	Stone, crude oil	W	--	--	--	--	W
Montgomery	19	Coal, stone, crude oil natural gas	65,009	--	--	Glass ^e	--	65,009
Morgan	101	--	--	--	--	--	--	--
Moultrie	96	Crude oil, sand & gravel	W	--	--	--	--	W
Ogle	51	Sand, stone	W	--	--	--	--	W
Peoria	37	Coal, sand & gravel, stone	16,181	Slag ^e	--	--	--	16,181
Perry	1	Coal, crude oil	332,446	--	--	--	--	332,446
Piatt	90	Sand & gravel, crude oil	392	--	--	--	--	392
Pike	60	Stone, natural gas, sand & gravel	W	--	--	--	--	W
Pope	99	Fluorspar ^g , lead ^g zinc ^g , silver ^g	--	--	--	--	--	--
Pulaski	40	Clay, stone, sand & gravel	W	--	--	Clay products	W	12,889
Putnam	97	Sand & gravel	41	--	--	--	--	41
Randolph	3	Coal, crude oil, stone sand & gravel, nat. gas	W	--	--	--	--	W
Richland	31	Crude oil	30,134	--	--	--	--	30,134
Rock Island	53	Stone, sand & gravel	W	--	--	--	--	W
St. Clair	10	Coal, stone, crude oil, sand & gravel, nat. gas	W	Iron oxide pigments, ground barite ^e , Primary slab zinc ^e	W	Glass ^e	--	W
Saline	5	Coal, crude oil, natural gas	130,312	--	--	--	--	130,312
Sangamon	20	Coal, crude oil, sand & gravel	61,045	Iron oxide pigments	W	--	--	W
Schuyler	91	Sand & gravel, stone	W	--	--	--	--	W
Scott	87	Stone	W	--	--	--	--	W
Shelby	77	Crude oil, stone	1,469	--	--	--	--	1,469
Stark	102	--	--	--	--	--	--	--
Stephenson	82	Stone, sand & gravel	W	--	--	--	--	W
Tazewell	68	Sand & gravel, clay	W	--	--	--	--	W
Union	58	Stone	W	--	--	--	--	W
Vermilion	54	Stone, coal, sand & gravel	W	--	--	--	--	W
Wabash	8	Coal, crude oil, sand & gravel	W	--	--	--	--	W
Warren	67	Stone	W	--	--	Clay products	W	W
Washington	27	Coal, crude oil, stone	W	--	--	--	--	W
Wayne	7	Crude oil, nat. gas	109,445	--	--	--	--	109,445
White	9	Crude oil, sand & gravel	W	--	--	--	--	W
Whiteside	63	Peat, sand & gravel, stone	W	--	--	--	--	W
Will	32	Stone, sand & gravel	17,045	Sulfur, expanded perlite	W	Glass ^e	--	W
Williamson	17	Coal, crude oil, natural gas	67,860	--	--	--	--	67,860
Winnebago	70	Stone, sand & gravel	1,965	--	--	--	--	1,965
Woodford	66	Sand & gravel	2,239	--	--	--	--	2,239
Undistributed		Crude oil	13,629	Pig iron	449,475	--	--	463,104
Values that cannot be disclosed (W)			1,280,293		59,072		167,551	1,674,983
TOTAL ^h			2,935,637 ⁱ		508,547		167,551	3,611,735 ⁱ

^aSources: U.S. Bureau of Mines, Illinois Department of Mines and Minerals, and Illinois State Geological Survey.^bSince some values are not available by county, county ranking cannot be exact.^cClark County crude oil value included with Cumberland County.^dPig iron not available by county.^eValue unknown. Not included in total.^fIncluding dimension stone.^gPope County fluorspar and metal values included in Hardin County.^hData may not add up to totals shown because figures have been rounded.ⁱ1981 stone figures are used for county break down. Totals are \$16,918 off the difference between 1981 and 1982 stone.

W = Withheld to avoid disclosing confidential data from individual companies.

MINERAL MATERIALS PROCESSED

In 1983, pig iron, natural gas liquids, expanded perlite, sulfur, ground barite, calcined gypsum, exfoliated vermiculite, iron-oxide pigments, crude iodine, bismuth, columbium, tantalum, and primary and secondary slab zinc were processed at a total value of \$577.9 million; the total value in 1982 was \$508.5 million, a decrease of nearly 50 percent from 1981 (table 1). Pig iron produced in Cook and Madison Counties accounted for more than 88 percent of this total. The large decline from 1981 was caused by the 1982 recession as demand fell sharply and prices softened. In fact, 14 counties processed raw mineral materials supplied by other states.

In 1983, Illinois ranked second nationally in sales of expanded perlite and ranked among the top producers in output of iron-oxide pigments.

All the commodities decreased in production from 1981 to 1982: gypsum decreased 98.9 percent; vermiculite, 23 percent; iron-oxide pigments, 19.9 percent; pig iron, 49.8 percent; and sulfur, 0.9 percent. In 1983, gypsum, iron-oxide pigments, and pig iron regained most of the losses. Vermiculite and sulfur continued to lose slightly.

MINERAL PRODUCTS MANUFACTURED

The mineral products manufactured in Illinois (primarily from materials mined within the state) were valued at \$192.4 million in 1981, \$167.6 million in 1982, and \$173.5 in 1983. These products include cement, coke, clay products, lime, and glass. The decrease from 1981 to 1982 is only an apparent decrease, mostly attributable to non-availability of data on coke value. In 1982, lime production decreased 36.8 percent, portland cement production increased 11.7 percent, and masonry cement decreased 15.5 percent. The value of clay products decreased 29.2 percent. Then in 1983, lime production increased about 18 percent, portland cement production increased 5.7 percent, and masonry cement stayed the same. The value of clay products increased about 7 percent.

EMPLOYMENT AND WAGES

Illinois mineral industries employed 158,900 persons in 1983, 185,100 persons in 1982, and 208,000 persons in 1981, according to the Illinois Department of Labor. Employment in the other mineral industries also decreased during this 2-year period. In 1983, mining, quarrying, and oil and gas extraction accounted for 24,100 persons—a decrease of 9.7 percent; mineral processing accounted for 90,400 persons—a decrease of 29.5 percent; and manufactured mineral products accounted for 44,400 persons—a decrease of 16.2 percent (table 4).

TABLE 4. Number of employees and average weekly earnings, hours worked, and hourly wages in Illinois Mineral Industry, 1981-83^a

Class of employment	1981				1982				1983			
	No. of employees (x 1000)	Average weekly earnings (\$)	Average no. of hrs worked/week	Average hourly earnings (\$)	No. of employees (x 1000)	Average weekly earnings (\$)	Average no. of hrs worked/week	Average hourly earnings (\$)	No. of employees (x 1000)	Average weekly earnings (\$)	Average no. of hrs worked/week	Average hourly earnings (\$)
Mining	26.7	481.91	41.1	11.73	27.7	527.84	41.2	12.81	24.1	576.73	42.8	13.48
Bituminous coal	14.0	544.64	39.6	13.75	15.7	597.09	41.4	14.42	13.6	654.17	43.0	15.23
Oil and gas extraction	7.3	438.79	42.7	10.26	7.3	465.35	39.5	11.79	5.9	485.78	40.9	11.88
Other	5.4	377.56	42.9	8.81	4.7	393.55	42.9	9.18	4.5	474.70	45.6	10.42
Mineral processing	128.3	484.66	41.1	11.79	109.6	477.84	38.7	12.35	90.4	496.70	40.3	12.33
Blast furnaces and basic steel	39.7	529.68	41.5	12.75	32.3	506.12	37.8	13.39	25.3	504.84	38.9	12.99
Primary metal industries	81.0	460.51	40.9	11.27	69.9	455.42	38.7	11.77	57.9	476.69	40.4	11.81
Petroleum refining	7.6	506.86	40.3	12.57	7.4	566.24	42.5	13.32	7.2	629.08	43.9	14.53
Mineral product manufacturing	53.0	382.66	40.3	9.50	47.8	416.20	40.4	10.30	44.4	459.12	41.9	10.95
Glass and glass products	9.4	370.71	40.2	9.22	8.5	424.33	41.4	10.26	7.8	472.07	42.8	11.04
Cement and clay products	3.2	311.99	40.7	8.17	3.2	322.15	38.1	8.45	3.5	368.96	40.5	9.12
Stone and other mineral products	29.8	363.67	40.3	9.02	26.7	381.77	39.5	9.67	23.9	418.07	41.1	10.17
Petroleum and coal products	10.6	467.95	40.3	11.63	9.4	538.62	42.9	12.57	9.2	589.11	43.9	13.62

^aSource: Illinois Department of Labor, Bureau of Employment Security.

TABLE 5. Selected mineral materials used in Illinois 1981-83^a

Commodity	Unit	1981			1982			1983		
		U.S.	Illinois	Illinois % of U.S. Consumption	U.S.	Illinois	Illinois % of U.S. Consumption	U.S.	Illinois	Illinois % of U.S. Consumption
Fuels										
Coal	million tons	709.5	36.5	5.14	709.6	36.3	5.12	707.8	36.3	5.13
Coke	million tons	44.0	NA	--	25.8	NA	--	29.9	NA	NA
Distillate fuel oils	million bbl	1,032.5	34.4	3.33	974.9	32.5	3.33	981.9	31.0	3.16
Gasoline	million bbl	2,482.1	109.5	4.41	2,446.4	107.7	4.40	2,481.7	109.7	4.42
Kerosene	million bbl	46.3	0.7	1.51	47.0	0.4	0.85	46.4	0.4	0.79
LPG & ethane	million bbl	495.3	31.6	6.38	462.9	22.7	4.90	550.7	NA	--
Natural Gas	trillion cu ft	19.4	1.1	5.67	18.0	1.0	5.56	16.8	0.9	5.57
Residual fuel oil	million bbl	762.0	21.4	2.81	634.2	15.5	2.44	518.6	11.8	2.27
Metals										
Pig iron	million tons	74.2	4.5	6.06	43.4	2.3	5.30	49.1	2.8	5.61
Lead	thousand tons	1,167.1	53.6	4.59	1,075.4	43.9	4.08	1,148.5	59.8	5.21
Zinc (slab)	thousand tons	840.9	128.2	15.25	709.5	100.4	14.15	800.3	121.2	15.14
Construction Materials										
Air-cooled slag	million tons	14.5	NA	--	13.6	NA	--	12.4	NA	--
Asphalt	million bbl	124.0	4.5	3.64	124.0	5.1	4.11	NA	NA	--
Cement	million tons	74.7	2.4	3.21	67.0	2.4	3.58	73.8	2.3	3.12
Road oil	million bbl	1.0	0.03	2.80	1.0	0.02	2.00	NA	NA	--
Sand and gravel	million tons	690.0	25.2	3.65	594.0	21.6	3.63	655.1	21.1	3.22
Stone	million tons	874.0	44.2	5.06	790.0	42.9	5.43	862.7	42.8	4.96
Agricultural & Chemical Materials										
Feldspar	thousand tons	655.0	31.1	4.75	610.0	26.9	4.41	710.0	46.6	6.56
Fluorspar	thousand tons	932.9	31.1	3.33	530.6	10.6	2.00	564.2	12.6	2.23
Lime ^b	thousand tons	18,890.0	857.0	4.54	14,112.0	586.0	4.15	14,902.0	664.0	4.46
Salt										
Evaporated	thousand tons	8,210.0	352.0	4.29	8,221.0	411.0	4.99	7,146.0	404.0	5.65
Rock	thousand tons	13,966.0	1,042.0	7.46	15,257.0	1,380.0	9.05	12,012.0	1,018.0	8.47

^asource: U.S. Bureau of Mines, U.S. Department of Energy.^bexcludes regenerated lime.

NA = not available at this time.

TRANSPORTATION OF MINERAL MATERIALS

The shipment of mineral materials forms a large part of the transportation industry in Illinois. In 1983, about 68.6 million tons of sand and gravel, stone, and coal were shipped by truck. About 55 percent of this tonnage was crushed stone; 33 percent was sand and gravel; and 12 percent was coal. About 42 million tons of mineral materials were shipped by rail; coal accounted for about 95 percent of this tonnage. Coal also accounted for the largest percentage of materials shipped by barge—about 71 percent of more than 13 million tons.

Other materials such as pig iron, fluorspar, coke, and clay products were shipped by railroad, truck, and barge. Crude oil and natural gas were mainly transported by pipeline; and minor amounts of coal were moved to mine-mouth generating plants by conveyor belt.

MINERAL AND ENERGY CONSUMPTION

As a leading manufacturing state, Illinois consumes a large variety of minerals each year. In 1983, the state's consumption of mineral commodities was about 5.0 percent of the nation's total, approximately proportionate to Illinois' share of the nation's total population (table 5).

In 1983, Illinois consumed an estimated 3,164.9

trillion Btu of energy, or 4.5 percent of the total energy consumed in the United States (table 6). About 90 percent of this came from fossil fuels.

Figure 2 shows the trends in total energy used in Illinois. In 1982, Illinois energy usage decreased for the fourth consecutive year; however, it increased in 1983. For example, the use of coal increased in 1979; but it has been declining since that time. In 1982 coal accounted for 25.8 percent of Illinois energy consumption. Oil products accounted for 30.7 percent; natural gas for 33.5 percent; and nuclear power for 10 percent.

COMMODITIES

MINERAL MATERIALS MINED

The mineral materials mined in Illinois are categorized into four groups: fuels, industrial and construction materials, metals, and other materials.

FUELS

Coal

Production. Illinois maintained fifth rank (behind Kentucky, West Virginia, Wyoming, and Pennsylvania) among the nation's coal-producing states in 1981 through 1983

(table 7). In 1981, Illinois coal production was down 17.2 percent from 1980 due to a strike by mine workers. The 1982 coal production recovered to just above the 1980 level, then dropped 5 percent in 1983.

Coal production was reported from 20 counties in 1981, 22 counties in 1982, and 23 counties in 1983 (fig. 3). Perry, Randolph, Franklin, Jefferson, and Macoupin were the five leading counties in 1981-82; they contributed 56.3 percent of total production in 1981 and 52.2 percent in 1982. In 1983, 52.5 percent was contributed by the top five counties: Perry, Franklin, Williamson, Jefferson, and Saline. The state's leading coal producer, Perry County, accounted for an increasing share of the state's surface-mined coal from 41.5 percent in 1981 to 54.1 percent in 1983. Underground coal production was more evenly distributed: Franklin, Jefferson, and Macoupin Counties accounting for 44.4 percent of total underground coal production in 1981 and 40 percent in 1982. In 1983, Franklin, Jefferson, and Christian Counties accounted for 38.6 percent of Illinois' underground coal production.

The number of mines operating has decreased from more than 150 in the 1950s to 54 in 1983. Of these 54 mines, 31 underground mines accounted for 57.1 percent

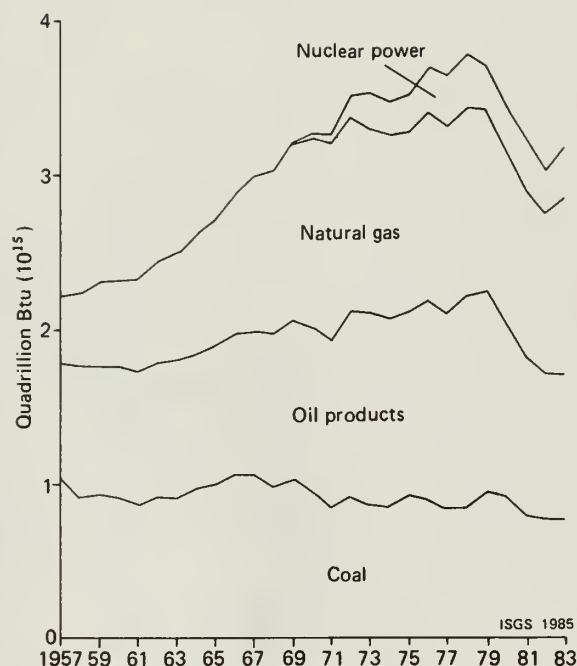


Figure 2 Total major energy used in Illinois from 1957-83. Hydro-power and early nuclear power (1960-69) were too small to show.

TABLE 6. Fuels and energy consumed in Illinois, 1981-83

Fuel	Units	1981	1982	1983	Change		Trillion Btu ^a		
					1981-82 (%)	1982-83 (%)	1981 ^b	1982 ^c	1983 ^d
Coal	thousand tons	36,585	36,342	36,332	- 0.2	- 0.3	791.9	785.9	783.0
Natural gas	million ft ³	1,061,957	994,179	1,106,238	- 6.4	+11.3	1,090.6	1,022.0	1,137.2
Gasoline	thousand bbl	109,476	107,675	109,746	- 1.6	- 1.9	575.1	565.6	576.5
Kerosene	thousand bbl	666	439	368	-34.1	+16.2	3.8	2.4	2.1
Distillate fuel oil	thousand bbl	34,427	32,521	31,020	- 5.5	+ 4.6	200.5	189.4	180.7
Residual fuel oil	thousand bbl	21,399	15,507	11,793	-27.5	-24.0	134.5	97.5	74.1
Liquid petroleum gases	thousand bbl	31,616	22,729	22,873	-28.1	+0.6	115.2	82.2	101.2
Hydropower	million kWh	134	124	134	- 7.5	+8.1	1.4	1.3	1.4
Nuclear power	million kWh	29,483	27,625	28,021	- 6.3	+1.4	325.2	304.3	308.7
TOTAL							3,238.2	3,050.6	3,164.9
Illinois percentage of total U.S. energy consumption							4.3	4.4	4.5
Percentage of total energy consumed in Illinois, by source									
Coal							24.46	25.76	24.74
Natural gas							33.68	33.50	35.93
Oil products							31.78	30.72	29.53
Nuclear power							10.04	9.98	9.76
Hydropower							0.04	0.04	0.04
							100.00	100.00	100.00

^aFuel conversion factors: gasoline--5,253,000 Btu/bbl; kerosene--5,670 Btu/bbl; distillate fuel oil--5,825,000 Btu/bbl; residual fuel oil--6,287,000 Btu/bbl.

^b1981 fuel conversion factors: coal--21,645,000 Btu/ton; natural gas--1,027 Btu/Mcf; LPG--3,643,000 Btu/bbl; nuclear power--10,908 Btu/kWh; hydropower--10,453 Btu/kWh.

^c1982 fuel conversion factors: coal--21,624,000 Btu/ton; natural gas--1,028 Btu/Mcf; LPG--3,615,000 Btu/bbl; nuclear power--11,015 Btu/kWh; hydropower--10,470 Btu/kWh.

^d1983 fuel conversion factors: coal--21,550,000 Btu/ton; natural gas--1,028 Btu/Mcf; LPG--3,612,000 Btu/bbl; nuclear power--11,015 Btu/kWh; hydropower--10,470 Btu/kWh.

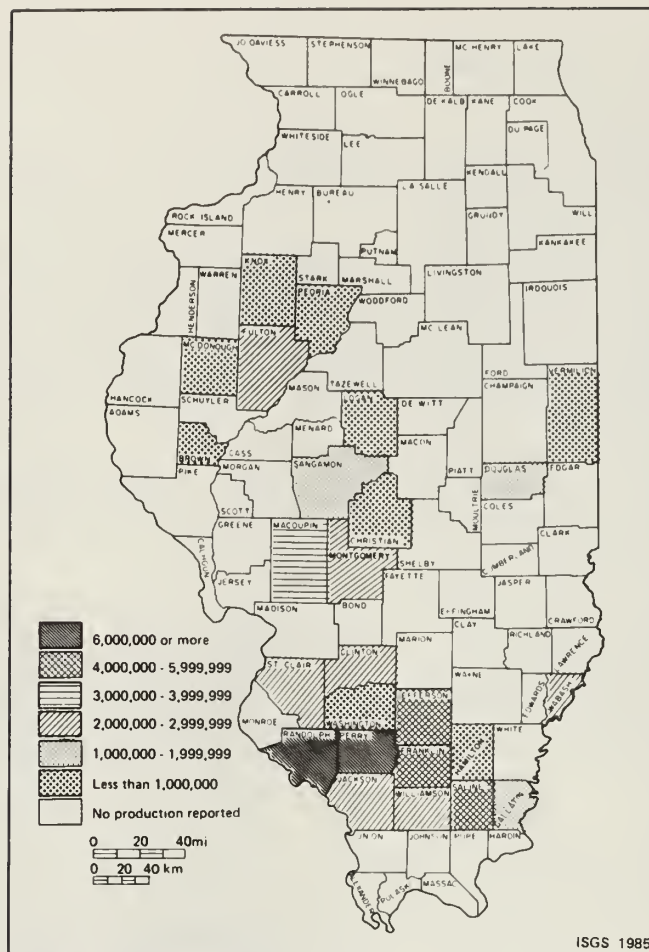


Figure 3 Illinois coal production, 1982.

TABLE 7. Illinois coal production by county, 1981-83

County	No. of mines	Underground (tons)	Surface (tons)	Total (tons)	Value ^b
1981 Production ^a					
Christian	1 ^c	1,848,646	--	1,848,646	50,837,765
Clinton	1	1,827,252	--	1,827,252	50,249,430
Douglas	2	1,830,157	--	1,830,157	50,329,318
Franklin	5	5,179,325	--	5,179,325	142,431,438
Fulton	3	--	2,129,582	2,129,582	58,563,505
Gallatin	1	843,900	--	843,900	23,207,250
Hamilton	1	652,586	--	652,586	17,946,115
Jackson	1	--	1,954,763	1,954,763	53,755,982
Jefferson	3	4,134,292	--	4,134,292	113,693,030
Logan	--	--	--	--	--
McDonough	--	--	--	--	--
Macoupin	3	3,673,250	--	3,673,250	101,014,375
Montgomery	1	1,353,446	--	1,353,446	37,219,765
Peoria	1	--	425,041	425,041	11,688,627
Perry	5	--	9,362,656	9,362,656	257,473,040
Randolph	6	2,427,338	4,365,781	6,793,119	186,810,773
St. Clair	2	1,171,294	779,129	1,950,423	53,636,632
Saline	10	1,230,330	1,507,803	2,738,133	75,298,658
Vermilion	2	126,668	550	127,218	3,498,495
Wabash	1	1,411,272	--	1,411,272	38,809,980
Washington	1	620,100	--	620,100	17,052,750
Williamson	8 ^d	905,647	2,037,845	2,943,492	80,946,030
TOTAL	58	29,235,503	22,563,150	51,798,653	1,424,462,958

TABLE 7. (continued)

County	No. of mines	Underground (tons)	Surface (tons)	Total (tons)	Value ^b
1982 Production ^a					
Christian	1 ^c	2,921,365	--	2,921,365	84,252,167
Clinton	1	2,791,743	--	2,791,743	80,513,868
Oouglas	2	1,770,679	--	1,770,679	51,066,382
Franklin	4	5,949,862	--	5,949,862	171,594,020
Fulton	3	--	2,255,407	2,255,407	65,045,938
Gallatin	3	1,251,643	6,279	1,257,922	36,278,470
Hamilton	1	648,073	--	648,073	18,690,425
Jackson	1	--	2,788,994	2,788,994	80,434,587
Jefferson	3	4,412,725	--	4,412,725	127,262,989
Logan	1	96,751	--	96,751	2,790,299
McDonough	1	--	283,428	283,428	8,174,064
Macoupin	3	3,909,226	--	3,909,226	112,742,078
Montgomery	1	1,700,670	--	1,700,670	49,047,323
Peoria	1	--	502,580	502,580	14,494,407
Perry	5	--	11,513,349	11,513,349	332,044,985
Randolph	6	2,459,676	3,848,245	6,307,921	181,920,442
St. Clair	2	1,321,096	977,300	2,298,396	66,285,741
Saline	10	1,910,621	1,355,594	3,266,215	94,197,641
Vermilion	2	300	59,817	60,117	1,733,774
Wabash	1	2,509,918	--	2,509,918	72,386,035
Washington	1	955,800	--	955,800	27,565,272
Williamson	7 ^d	1,073,723	2,153,306	3,227,029	93,067,516
TOTAL	60	35,683,871	25,744,299	61,428,170	1,771,588,423
1983 Production ^a					
Christian	1 ^c	3,199,600	--	3,199,600	93,972,252
Clinton	1	2,379,668	--	2,379,668	69,890,849
Oouglas	2	1,163,533	--	1,163,533	34,172,964
Franklin	4	5,864,413	--	5,864,413	172,237,810
Fulton	3	--	2,318,395	2,318,395	68,091,261
Gallatin	3	1,105,729	90,590	1,196,319	35,135,889
Hamilton	1	775,611	--	775,611	22,779,695
Jackson	1	--	2,385,855	2,385,855	70,072,561
Jefferson	2	3,811,278	--	3,811,278	111,937,235
Logan	1	532,611	--	532,611	15,642,785
McDonough	1	--	498,296	498,296	14,634,954
Macoupin	2	2,563,865	--	2,563,865	75,300,715
Montgomery	1	472,473	--	472,473	13,876,532
Peoria	1	--	533,618	533,618	15,672,361
Perry	5	--	13,538,276	13,538,276	397,619,166
Randolph	4	2,695,048	901,945	3,596,993	105,643,685
St. Clair	2	1,337,278	851,600	2,188,878	64,287,347
Saline	10	2,469,380	1,144,735	3,614,115	106,146,558
Vermilion	1	63,582	--	63,582	1,867,403
Wabash	1	2,698,046	--	2,698,046	79,241,611
Washington	1	1,110,900	--	1,110,900	32,627,133
White	1	25,722	--	25,722	755,455
Williamson	5	1,101,646	2,739,887	3,841,533	112,825,824
TOTAL	54	33,370,383	25,003,197	58,373,580	1,714,432,045

^aproduction figures from Illinois State Department of Mines and Minerals, Annual Coal, Oil and Gas Report, 1981, 1982, and 1983.

^bvalue calculated at an average of \$27.50/ton for 1981, \$28.84/ton for 1982, and \$29.37/ton for 1983.

^cone mine operated at junction of Christian, Montgomery, and Sangamon Counties; all production placed in the county where tippie is located.

^done mine operated at junction of Williamson and Saline Counties; all production placed in county where tippie is located.

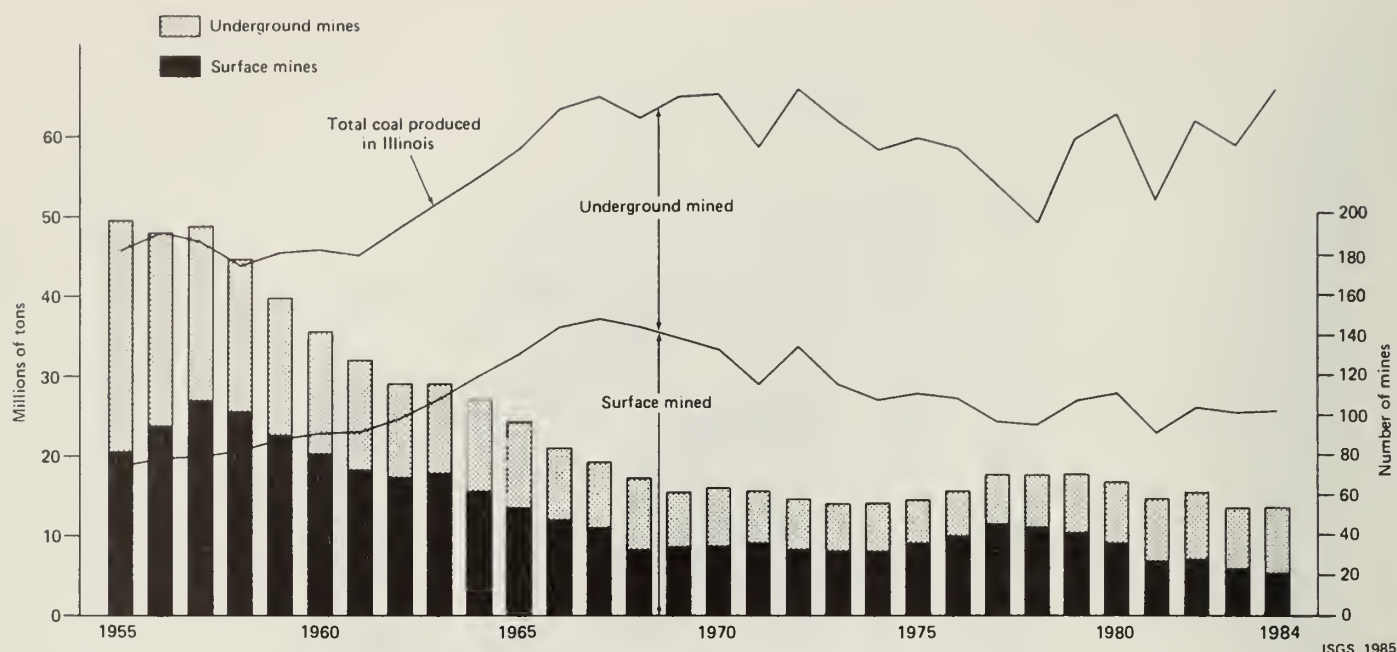


Figure 4 Trends in coal production, 1955-83.

of production. In 1982, underground production represented 58.1 percent, and in 1981, 56.4 percent of the total production. Surface-mined production has been declining since 1968, when 59.2 percent of coal was surface mined (fig. 4).

Since 1833 a total of 5,013.3 million tons of coal have been produced from Illinois coal mines (table 8). Of this total, 1,143.5 million tons (22.8 %) have been surface mined since 1911.

The average output per underground mine reached a peak in 1975; it has not changed significantly since 1977, except for the strike-affected years 1978 and 1981. Although the average output per surface mine declined rapidly between 1973 and 1977, it has been on the rise again for several years and slightly surpassed the 1973 high in 1982 and 1983 (table 9). In 1983 for the first time since 1968, average output of surface mines (1.09 million tons) exceeded that of underground mines (1.08 million tons).

Twenty coal-mining companies operated in Illinois in both 1981 and 1982, and 21 in 1983 (table 10). The top five companies—Peabody, Consolidated, Freeman United, Amax, and Old Ben—represented 67 percent of the state's production in 1981, 69 percent in 1982, and 66 percent in 1983.

Employment and wages Employment in Illinois coal mines declined from 18,148 persons in 1981 to 14,951 in 1982 and to 14,759 in 1983, despite an 18.6 percent increase in coal production in 1982 and a small decline in 1983 (table 9). Employment per underground mine declined 23.4 percent in 1982 but increased 2.7 percent in 1983. Employment per surface mine decreased 11.8 per-

cent in 1982 but increased 17.8 percent in 1983. The hourly wages for bituminous coal miners increased from \$13.75 in 1981 to \$14.42 in 1982 and to \$15.23 in 1983 (table 4). The average number of hours worked weekly increased from 39.6 in 1981 to 41.4 in 1982 and 43.0 in 1983.

Mine productivity Mine productivity is measured in tons of coal per person-day, or the average amount of coal (tons) mined by a single worker during an 8-hour shift. Decreasing employment and increasing production generally reflect increasing labor productivity. The 1983 underground labor productivity increased 6 percent to 14.2 tons from the previous year. This was still considerably below the peak level of 22.9 tons per person-day in 1969.

In 1983, surface-mine productivity increased to 23.3 tons per person-day from about 20 tons in 1981 and 1982, but remained considerably below the peak of 41.6 tons per person-day in 1967 (fig. 5).

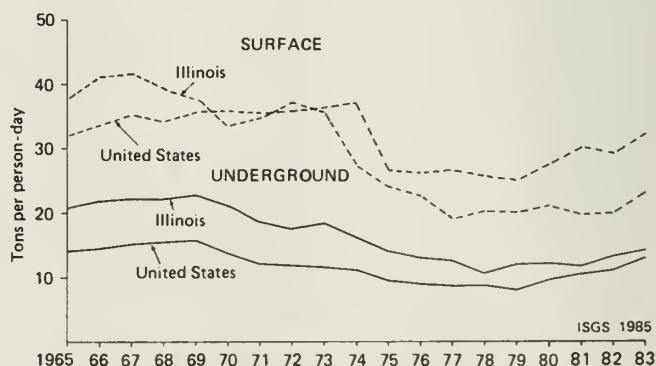


Figure 5 Trends in coal mine productivity, 1965-83.

Table 8. Cumulative surface and total coal production in Illinois by county, 1833-1983^a

County	Cumulative total surface production (tons)	Cumulative total production (tons)	County	Cumulative total surface production (tons)	Cumulative total production (tons)
Adams	338,147	341,924	Macoupin	--	306,392,048
Bond	--	7,355,569	McDonough	808,146	3,416,627
Brown	41,761	74,068	McLean	--	5,544,139
Bureau	11,094,808	53,823,055	Madison	37,843	164,295,772
Calhoun	--	96,247	Marion	--	39,247,722
Cass	--	212,477	Marshall	4,779	12,516,141
Christian	--	335,306,057	Menard	--	13,462,005
Clark	4,482	4,482	Mercer	67,080	15,519,862
Clay	801	801	Monroe	--	8,284
Clinton	--	49,503,802	Montgomery	--	141,824,660
Coles	--	198,932	Morgan	13,564	190,787
Crawford	17,315	45,400	Moultrie	--	2,032,236
Douglas	--	36,527,868	Peoria	32,309,446	96,325,248
Edgar	207,242	915,698	Perry	286,365,213	384,175,723
Effingham	--	796	Pike	2,224	5,081
Franklin	--	633,541,789	Pope	34,704	36,266
Fulton	235,177,789	311,773,175	Putnam	--	10,071,893
Gallatin	7,369,461	33,442,391	Randolph	93,720,856	187,559,794
Greene	71,090	693,191	Richland	35	154
Grundy	1,635,422	40,872,430	Rock Island	--	3,846,169
Hamilton	--	2,432,882	St. Clair	115,243,602	358,484,599
Hancock	459,329	771,281	Saline	53,359,343	265,594,694
Hardin	--	40	Sangamon	--	233,449,607
Henry	9,065,783	22,910,053	Schuyler	6,044,275	7,747,691
Jackson	45,638,823	113,311,735	Scott	3,790	612,476
Jasper	--	23,739	Shelby	925	4,119,763
Jefferson	5,353,358	131,387,997	Stark	8,342,056	9,569,336
Jersey	2,290	120,350	Tazewell	--	17,633,802
Johnson	72,781	314,325	Vermilion	30,651,670	165,721,654
Kankakee	18,284,342	19,192,105	Wabash	12,082	17,568,024
Knox	62,601,174	65,896,605	Warren	132	685,466
La Salle	2,345,878	65,547,638	Washington	--	21,603,737
Livingston	139,091	10,111,437	White	--	1,702,463
Logan	--	15,162,738	Will	29,333,708	37,553,733
Macon	--	11,000,468	Williamson	87,215,616	440,675,008
			Woodford	--	7,810,160
Total cumulative surface production, 1911-1983			Estimated production, all counties, 1833-1881		
1,143,492,256			73,386,123		
Total cumulative production, 1882-1983			Total cumulative production, 1833-1983		
4,939,916,369			5,013,302,492		

^asource: Illinois State Department of Mines and Minerals, Annual Coal, Oil and Gas Reports.
Note: this table has been revised with production placed in county where tipple is located.

TABLE 9. Coal mines, employees, and production by method of mining in Illinois, 1973-83^a

Year	Underground				Surface			
	No. of mines	No. of employees	Average production /mine (tons)	Average no. of employees/mine	No. of mines	No. of employees	Average production /mine (tons)	Average no. of employees/mine
1973	24	7,794	1,357,390	325	32	3,615	905,353	113
1974	23	8,718	1,352,353	379	32	3,749	842,767	117
1975	21	9,549	1,518,099	455	36	4,097	768,304	114
1976	23	10,396	1,343,987	452	39	4,392	698,063	113
1977	25	11,375	1,183,559	455	45	4,739	539,810	105
1978	28	12,620	888,914	451	43	5,241	554,757	122
1979	31	13,200	1,054,233	426	40	5,299	671,422	132
1980	31	13,219	1,128,022	426	35	5,065	787,821	145
1981	31	13,351	943,081	431	27	4,797	835,672	178
1982	32	10,554	1,115,121	330	28	4,397	919,439	157
1983	31	10,514	1,076,464	339	23	4,245	1,087,096	185

^asource: Illinois State Department of Mines and Minerals, Annual Coal, Oil and Gas Report, 1973-1983.

TABLE 10. Illinois coal production by company, 1981-83^a

Rank	Company	No. of mines		Production (tons)	% of total production	No. of employees
		Underground	Surface			
1981 Production						
1	Peabody Coal	5	3	9,478,497	18.30	3,376
2	Consolidation Coal	1	4	7,825,790	15.11	1,765
3	Freeman United Coal Mining	5	2	6,327,208	12.21	2,915
4	AMAX Coal	1	3	5,885,011	11.36	1,721
5	Old Ben Coal	5	0	5,179,325	10.00	2,171
6	Southwestern Illinois Coal	0	2	4,443,312	8.58	777
7	Monterey Coal	2	0	4,147,288	8.01	1,335
8	Zeigler Coal	4	0	2,856,595	5.51	1,251
9	Inland Steel	2	0	2,212,345	4.27	1,277
10	Sahara Coal	3	1	1,185,051	2.29	592
11	Midland Coal	0	2	871,808	1.68	256
12	Kenellis Energies	1	0	489,830	0.95	285
13	Equality Mining	0	1	241,265	0.47	25
14	Williamson Coal	0	1	172,100	0.33	62
15	Classic Coal	1	0	131,262	0.25	260
16	Lee Coal	1	1	127,218	0.25	15
17	E & B Coal	0	3	90,057	0.17	29
18	Jader Fuel	0	2	72,366	0.14	22
19	J.J. Track Mining	0	1	56,501	0.11	12
20	North Side Mine	0	1	5,824	0.01	2
21	Turris Coal	-	-	--	-	-
TOTAL		31	27	51,798,653	100.00	18,148
1982 Production						
1	Peabody Coal	5	3	11,415,439	18.58	2,935
2	Consolidation Coal	1	4	9,880,350	16.08	1,568
4	Freeman United Coal Mining	5	3	7,492,161	12.20	1,878
3	AMAX Coal	1	3	7,893,664	12.85	1,832
5	Old Ben Coal	4	0	5,949,862	9.69	1,679
7	Southwestern Illinois Coal	0	2	4,730,952	7.70	783
6	Monterey Coal	2	0	4,834,881	7.87	1,295
9	Zeigler Coal	4	0	2,448,755	3.99	653
8	Inland Steel	2	0	2,561,196	4.17	773
10	Sahara Coal	4	1	1,412,149	2.30	623
11	Midland Coal	0	2	1,061,588	1.73	246
12	Kenellis Energies	1	0	942,536	1.53	317
13	Equality Mining	0	1	295,613	0.48	25
14	Williamson Coal	0	1	211,578	0.34	60
	Classic Coal	-	-	--	--	--
17	Lee Coal	1	1	60,117	0.10	18
14	E & B Coal	0	3	24,379	0.04	24
16	Jader Fuel	1	2	97,998	0.16	41
19	J.J. Track Mining	0	1	16,237	0.03	3
20	North Side Mine	0	1	1,964		2
16	Turris Coal	1	0	96,751	0.16	196
TOTAL		32	28	61,428,170	100.00	14,951

TABLE 10. (continued)

Rank	Company	No. of mines		Production (tons)	% of total production	No. of employees
		Underground	Surface			
1983 Production						
1	Peabody Coal	5	3	10,433,128	17.87	2,682
2	AMAX Coal	1	3	8,900,739	15.25	1,862
3	Consolidation Coal	1	3	7,836,365	13.42	1,133
4	Old Ben Coal	4	0	5,864,413	10.05	1,631
5	Freeman United Coal Mining	3	3	5,542,828	9.50	1,762
6	Southwestern Illinois Coal	0	2	5,434,786	9.31	838
7	Monterey Coal	2	0	4,061,838	6.96	1,244
8	Inland Steel	2	0	3,202,226	5.49	1,108
9	Zeigler Coal	3	0	1,875,750	3.21	706
10	Kenellis Energies	1	0	1,602,793	2.75	340
11	Sahara Coal	4	1	1,272,781	2.18	568
12	Midland Coal	0	2	1,100,448	1.89	239
13	Turris Coal	1	0	532,611	0.91	254
14	Jader Fuel	1	1	249,327	0.43	42
15	Williamson Coal	0	1	180,371	0.31	42
16	Equality Mining	0	1	103,856	0.18	25
17	Lee Coal	1	0	63,582	0.11	30
18	Kerr-McGee Coal	1	0	55,000	0.09	198
19	White County Coal	1	0	25,722	0.04	38
20	E & B Coal	0	2	20,856	0.03	15
21	J. J. Track Mining	0	1	14,160	0.02	2
TOTAL		31	23	58,373,580	100.00	14,759

^asource: Illinois State Department of Mines and Minerals, Annual Coal, Oil and Gas Report, 1981-83.

Prices In 1980, the revised average price of Illinois coal (f.o.b. mine) was \$24.39 per ton. Average prices increased by 12.8 percent in 1981, 4.9 percent in 1982, and 1.8 percent in 1983 to reach \$29.37 per ton (table 7). In general, the price for coal mined underground was higher than the average, while the price for surface-mined coal was lower than the average.

Shipments Illinois coal is used throughout the United States. In 1983, about 86.5 percent of Illinois coal was used by electric utility plants, 4.3 percent by coke plants manufacturing metallurgical coke, and 8.0 percent was sold to industrial plants (table 11).

Missouri, Indiana, Georgia, Wisconsin, Iowa, and Florida took 88 percent of all out-of-state shipments in both 1982 and 1983, compared with about 86 percent in 1981. The overall development of the coal industry in Illinois in the past 5 years has paralleled the development of the nation's coal industry, except in the export sector. Illinois' coal exports reached about 1 million tons in 1981, but declined to 0.4 million tons in 1982 and 0.33 million tons in 1983. In comparison, U.S. exports declined from 111 million tons in 1981 to 104 million tons in 1982 and 76.8 million tons in 1983, but stayed higher in relation to total coal production than Illinois exports.

Of the Illinois coal shipped to electric utilities in 1983, about 34 percent was consumed within the state, and about 29 percent was consumed in Missouri; the

remainder was shipped to surrounding midwestern states and to the southeastern states. The market for Illinois utility coal increased in Georgia, Florida, and Alabama, as the demand for electric power grew. Illinois coal competes favorably with higher priced Appalachian coal in the southeastern United States. From 1978 to 1982, Illinois coal shipments to Georgia and Florida alone have increased 163 percent. On the other hand, Illinois has been losing its utility market share in Wisconsin to the low-sulfur coals from western states that meet the standards for emission of sulfur oxides; however, actual tonnage was up 26 percent in 1982 and 4.8 percent in 1983. The use of Illinois coal in Illinois utilities declined 10 percent between 1980 and 1983.

In 1983, about 81 percent of coking coal from Illinois was shipped to plants in northwestern Indiana, while only 11 percent was consumed within the state. Between 30 and 32 percent of the Illinois coal used for other industrial purposes in 1981 through 1983 was consumed in Illinois. Missouri consumed approximately 22 percent during 1981 and 1982, and about 16 percent in 1983. Iowa, Wisconsin, and Indiana were also major users of industrial coal from Illinois.

Transportation According to the Illinois Department of Mines and Minerals, coal was transported from the mine to the consumer by rail, barge, or truck:

	Tonnage		
	1981	1982	1983
Rail	40,813,641	43,685,833	39,838,997
Barge or rail/barge combination	2,380,414	5,677,129	9,004,751
Local trade/truck	8,389,031	10,561,067	8,490,655

	Tonnage		
	1981	1982	1983
Missouri-Pacific Lines	16,666,053	18,990,275	18,708,920
Illinois Central Gulf	11,735,173	13,716,165	15,019,344
Burlington Northern	2,539,358	3,584,188	3,019,057
Southern	1,827,252	3,022,425	2,807,755
Conrail	1,843,560	2,522,961	2,255,861
Chicago Northwestern	1,829,792	1,700,623	2,227,593
Others	4,362,453	3,975,775	3,183,345
TOTAL	40,813,641	47,501,402	47,221,875

Consumption The total amount of coal consumed in Illinois continued to decline for the fourth year in succession, partly due to environmental constraints and partly for economic reasons (table 12). In 1983 only about 33 percent of Illinois coal production was consumed within the state. While more Illinois coal is being shipped to out-of-state destinations, consumption of coals from Indiana and West Kentucky is growing in Illinois. In both 1982 and 1983, about 3 million tons of Indiana and West Kentucky coals were consumed in Illinois, as compared with 2.48 million tons in 1981. Due to lower transportation costs, most Indiana coal goes to electric utilities situated close to the Illinois-Indiana border in Vermilion, Crawford, and Jasper Counties, while West Kentucky coal is barged conveniently and at low costs to Massac County on the Ohio River as well as to destinations along the Illinois River.

Fifty-four percent of the coal used by utilities generating electricity in Illinois was supplied within the state: 36 percent came from western states, 2 percent from western Kentucky and 5 percent from Indiana, 4 percent from southern West Virginia, Virginia and eastern Kentucky.

Illinois coke and gas plants met about 17 percent of their needs from mines within the state and 76 percent from West Virginia, Virginia, eastern Kentucky, Ohio, and eastern Pennsylvania. For industrial and other purposes Illinois supplied 48 percent of the 2.9 million tons of coal, with 27 percent coming from Indiana and 21 percent from southern West Virginia, Virginia, and eastern Kentucky.

Crude Oil

Production Illinois crude oil production continued to increase for the fourth consecutive year reaching 29.2

million barrels in 1983, a 34 percent increase in 4 years (table 13). The 1983 production was valued at \$849.1 million, with an average unit value of \$29.08 per barrel. The secondary production method of waterflooding accounted for 38.8 percent of the total oil produced in 1983, 34.5 percent in 1982, and 42.9 percent in 1981 (fig. 6). Pressure maintenance projects reported less than 0.5 percent of oil production in all 3 years.

With the discovery of the Brooklyn field, Schuyler County was added in 1983 to the 43 counties already producing oil. Also, two counties were added in 1983 to the list of 9 counties producing 1 million barrels each in 1981 and 1982. The contribution of the major oil-producing counties thus increased from about 68 percent of the state's total oil production in 1981-82 to 73.4 percent in 1983. Their relative importance is represented in the following tabulation:

County	1981 (%)	1982 (%)	1983 (%)
Wayne	13.0	12.4	10.7
White	12.6	11.7	11.4
Marion	8.1	9.7	8.7
Lawrence	7.9	8.1	9.0
Fayette	6.7	6.1	6.8
Crawford	6.2	5.8	5.9
Clay	5.5	5.3	4.8
Edwards	4.2	4.5	4.8
Wabash	4.0	3.8	3.8
Franklin	—	—	4.1
Jefferson	—	—	3.5

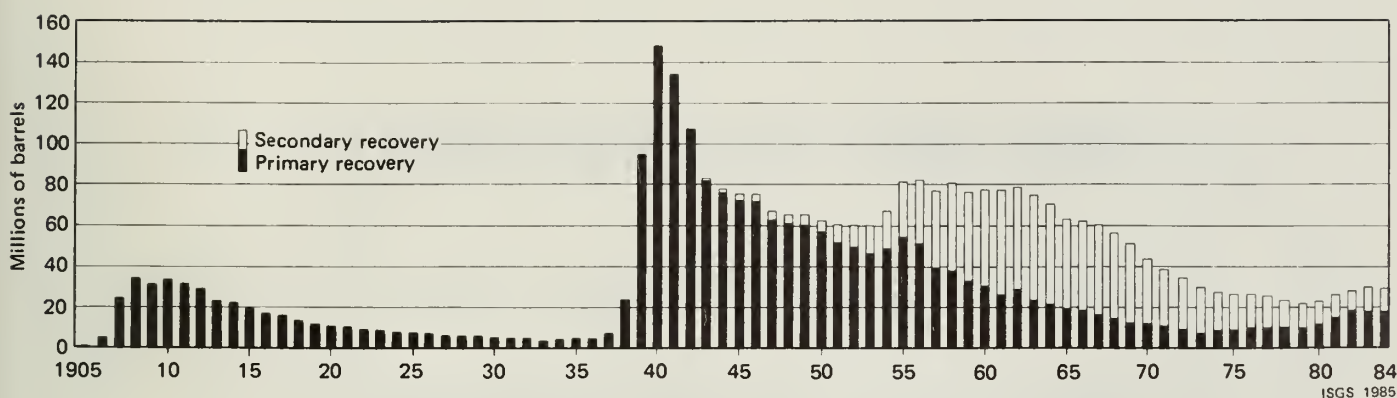


Figure 6 Annual crude oil production, 1905-84.

TABLE 11. Illinois coal shipments, by state destination and consuming sector, 1978-83 (1,000 tons)^a

Consuming sector	Wisconsin	Minnesota and Michigan	Iowa	Missouri	Indiana	Kentucky	Georgia and Florida	Other states ^b	Exports and miscellaneous	Illinois	Total
Electric utilities											
1978	3,536	1,465	1,660	9,708	3,330	335	1,874	1,288	12	17,934	41,142
1979	3,236	1,501	1,955	11,653	6,843	464	2,950	2,382	--	18,867	49,851
1980	2,805	1,313	1,644	12,649	7,616	222	3,970	3,786	--	18,700	52,705
1981	2,198	839	1,240	11,933	5,249	--	4,680	2,873	--	14,930	43,941
1982	2,774	940	1,691	14,447	7,239	122	4,934	3,304	--	17,260	52,710
1983	2,907	616	1,659	14,428	5,999	53	4,431	2,997	--	16,812	49,903
Coke & gas plants											
1978	--	--	--	--	1,615	--	--	40	--	486	2,141
1979	--	--	--	--	2,459	--	--	--	24	444	3,013
1980	--	--	--	--	2,335	--	--	--	--	545	2,053
1981	--	--	--	28	2,004	--	--	8	--	317	2,356
1982	--	--	--	--	1,876	--	--	55	--	317	2,248
1983	--	--	--	--	1,979	--	--	200	--	276	2,455
Retail dealers											
1978	19	4	13	20	3	--	--	--	12	100	171
1979	20	10	41	28	15	--	--	--	--	63	177
1980	--	5	12	12	1	--	--	--	20	107	157
1981	--	--	1	23	4	--	--	--	20	192	240
1982	13	--	10	16	1	--	--	--	24	236	300
1983	1	11	--	30	--	--	--	--	--	319	382
All others											
1978	439	185	541	1,272	492	--	--	71	46	1,989	5,035
1979	575	187	859	1,449	574	--	201	49	49	2,364	6,258
1980	521	201	928	1,212	517	8	447	78	47	2,222	6,181
1981	625	188	667	1,054	495	34	84	173	64	1,559	4,943
1982	651	155	873	972	378	12	--	59	36	1,363	4,499
1983	832	193	888	733	528	--	--	46	35	1,379	4,634
Totals^c											
1978	3,994	1,654	2,214	11,000	5,440	335	1,874	1,399	70	20,509	48,489
1979	3,831	1,698	2,855	13,216	9,891	464	3,151	2,431	73	21,738	59,348
1980	3,326	1,520	2,583	13,947	10,469	230	4,417	3,864	67	21,575	62,002
1981	2,823	1,027	1,908	13,038	7,752	34	4,764	3,054	1,022 ^d	16,998	52,419 ^d
1982	3,438	1,095	2,574	15,435	9,494	134	4,934	3,418	395 ^d	19,176	60,122 ^d
1983	3,739	820	2,547	15,192	8,506	53	4,431	3,243	329 ^d	18,786	57,717 ^d

^asources: U.S. Bureau of Mines, Bituminous Coal and Lignite Distribution Quarterly, 1978-1979.
U.S. Department of Energy, Coal Distribution, 1980-1983.

^bincludes AL (1978-83), MS (1978-83), TN (1978-83), LA (1978-83), OH (1982), PA (1978-83), NY (1981-82), KS (1981-83), TX (1981-83), and CA (1983).

^ctotals may not add up because of independent rounding.

^dincludes shipments to foreign countries, with no breakdown by consuming sector: 938,000 tons in 1981, 335,000 tons in 1982, and 294,000 tons in 1983.

TABLE 12. Shipment of coal for consumption in Illinois, by area of origin and consuming sector, 1978-83 (1,000 tons)^a

Consuming sector	Illinois	Western Kentucky	Indiana	Ohio, eastern Pennsylvania, and northern West Virginia	Southern West Virginia, eastern Kentucky	Western Interior States	Western states ^e	Montana ^f and Washington	Pennsylvania ^h	Total coal consumed in Illinois
Electric utilities										
1978	17,934	725	674	86	1,207	26	6,904	5,639	--	33,195
1979	18,867	820	849	491	1,081	62	8,407	6,691	--	37,268
1980	18,700	463	669	--	733	26	11,997	3,920	--	36,508
1981	14,930	839	965	--	949	27	10,616	3,494	--	31,820
1982	17,260	1,000	1,209	--	802	41	9,109	2,697	--	32,118
1983	16,812	738	1,467	--	1,118	2	8,415	2,848	3	31,404
Coke & gas plants										
1978	486	--	--	121	1,365	159 ^g	--	--	--	2,131
1979	444	--	--	225	1,347	87	--	--	--	2,103
1980	545	--	--	350	1,095	62	--	--	--	2,052
1981	317	--	--	541	802	68	--	--	--	1,728
1982	317	--	--	470	380	82	--	--	1	1,251
1983	276	--	--	581	639	112	--	--	--	1,608
Retail dealers										
1978	100	2	--	--	53	3	52	--	--	210
1979	63	2	--	--	22	--	2	--	--	89
1980	107	1	30	--	15	--	--	--	1	154
1981	192	2	9	--	14	--	--	--	4	222
1982	236	16	51	--	7	--	--	--	1	310
1983	319	22	52	--	28	--	--	--	3	423
All others										
1978	1,989	80	157	--	286	186	466	--	--	3,164
1979	2,364	27	185	35	467	51	121	9	--	3,259
1980	2,222	9	381	3	695	19	--	--	62	3,391
1981	1,559	11	655	--	518	12	--	--	61	2,815
1982	1,363	49	655	22	533	5	17	--	20	2,664
1983	1,379	77	787	--	599	--	29	--	24	2,897
Total										
1978	20,509	807	831	207	2,911	374	7,422	5,639	--	38,700
1979	21,738	849	1,034	751	2,917	200	8,530	6,700	--	42,719
1980	21,575	472	1,080	353	2,539	107	11,997	3,920	63	42,106
1981	16,998	852	1,283	541	2,283	107	10,616	3,494	66	36,585
1982	19,176	1,065	1,914	493	1,721	128	9,125	2,697	22	36,342
1983	18,786	838	2,307	581	2,384	114	8,444	2,848	30	36,332

^aSources: U.S. Department of Energy, Bituminous Coal and Lignite Distribution, Calendar Years 1978-79; U.S. Department of Energy, Coal Distribution, 1980-83.

^bIncludes Districts 1, 2, 3, 4, and 6 (MO, OH, eastern PA, northern WV).

^cIncludes Districts 7, 8, and 13 (AL, GA, eastern KY, NC, TN, VA, southern WV).

^dIncludes Districts 14 and 15 (AR, KS, MO, OK, TX).

^eIncludes Districts 16, 17, and 19-21 (CO, IO, NO, NM, SO, UT, WY).

^fIncludes Districts 22 and 23 (AK, MT, OR, WA).

^gEstimated: Includes minor amounts of coal shipped to other consuming sectors.

^hData started in 1980, Anthracite.

TABLE 13. Cumulative crude oil production by county, 1888-1983^a

County	1888-1983			1981			1982			1983		
	cumulative production (1000 bbl)			Production (1000 bbl)	% of total Illinois production	Value ^d (\$1000)	Production (1000 bbl)	% of total Illinois production	Value ^d (\$1000)	Production (1000 bbl)	% of total Illinois production	Value ^d (\$1000)
Adams	185			3	0.0	104	2	0.0	68	44	0.2	1,290
Bond	7,702			51	0.2	1,847	53	0.2	1,670	74	0.3	2,145
Brown	1,309			4	0.0	127	390	1.4	12,359	747	2.6	21,722
Champaign	7			--	--	--	--	--	--	--	--	--
Christian	27,483			314	1.2	11,325	302	1.1	9,583	320	1.1	9,303
Clark-Cumberland	92,925			336	1.3	12,117	351	1.3	11,130	379	1.3	11,022
Clay	140,303			1,411	5.5	50,830	1,469	5.3	46,541	1,396	4.8	40,582
Clinton	85,558			408	1.6	14,700	386	1.4	12,231	367	1.3	10,687
Coles	23,954			147	0.6	5,284	126	0.5	4,009	139	0.5	4,045
Crawford	239,120			1,593	6.3	57,390	1,615	5.8	51,165	1,724	5.9	50,141
De Witt	3,474			61	0.2	2,193	69	0.2	2,195	73	0.3	2,128
Douglas	3,649			9	0.0	306	7	0.0	212	4	0.0	104
Edwards	4,240			88	0.3	3,163	73	0.3	2,323	66	0.2	1,927
Effingham	51,688			1,065	4.2	38,352	1,235	4.5	39,125	1,392	4.8	40,487
Fayette	18,142			294	1.2	10,578	315	1.1	9,982	297	1.0	8,626
Franklin	402,219			1,703	6.7	61,331	1,688	6.1	53,499	1,980	6.8	57,564
Gallatin	75,192			581	2.3	20,928	809	2.9	25,647	1,190	4.1	34,606
Gallatin	53,353			501	2.0	18,050	560	2.0	17,742	513	1.8	14,905
Hamilton	135,400			636	2.5	22,921	593	2.1	18,790	506	1.7	14,719
Jackson	53			6	0.0	224	12	0.0	383	23	0.1	661
Jasper	55,517			824	3.2	29,686	865	3.1	27,398	824	2.8	23,964
Jefferson	87,683			862	3.4	31,063	983	3.5	31,166	1,032	3.5	30,000
Lawrence	406,278			2,011	7.9	72,420	2,254	8.1	71,426	2,634	9.0	76,583
Macon	2,033			300	1.2	10,790	337	1.2	10,685	210	0.7	6,093
Macoupin	317			10	0.0	371	9	0.0	300	10	0.0	280
Madison	18,047			128	0.5	4,617	125	0.5	3,968	143	0.5	4,154
Marion	422,620			2,061	8.1	74,236	2,698	9.7	85,489	2,554	8.7	74,281
McDonough-Hancock ^c	5,657			29	0.1	1,059	24	0.1	748	24	0.1	686
Monroe	65			5	0.0	196	f	--	10	1	0.0	19
Montgomery	132			2	0.0	65	2	0.0	56	3	0.0	102
Moultrie	113			2	0.0	76	2	0.0	65	2	0.0	54
Perry	887			13	0.1	482	13	0.1	401	12	0.0	346
Platt	4			f	--	9	f	--	15	3	0.0	98
Randolph	4,746			44	0.2	1,572	44	0.2	1,391	37	0.1	1,090
Richland	106,872			936	3.7	33,716	951	3.4	30,134	920	3.1	26,751
St. Clair	3,505			9	0.0	318	14	0.1	441	24	0.1	707
Saline	22,777			286	1.1	10,306	287	1.0	9,095	417	1.4	12,132
Sangamon	4,530			206	0.8	7,420	328	1.2	10,406	320	1.1	9,300
Schuyler	134			--	--	--	--	--	--	133	0.5	3,866
Shelby	1,902			37	0.1	1,319	42	0.2	1,341	35	0.1	1,007
Habash	114,264			1,017	4.0	36,622	1,045	3.8	33,127	1,095	3.7	31,842
Washington	33,428			628	2.5	22,607	476	1.7	15,080	413	1.4	12,007
Wayne	262,737			3,323	13.0	119,707	3,440	12.4	109,015	3,125	10.7	90,865
White	301,429			3,205	12.6	115,447	3,236	11.7	102,537	3,316	11.4	96,442
Williamson	2,583			48	0.2	1,730	48	0.2	1,526	40	0.1	1,159
Other ^b	7,187			293 ^b	1.2	10,543	430 ^b	1.6	13,629	641	2.2	18,646
Total ^e	3,232,554			25,490	100.0	918,147	27,709	100.0	878,101	29,200	100.0	849,137

^aSource: Illinois State Geological Survey Oil and Gas Section.^bcould not be assigned to individual field or county.^cNo oil production reported for Hancock County in 1971-1978. There was 3,526 bbls in 1981, 3,740 bbls in 1982, and 4,058 bbls in 1983.^dValue calculated at an estimated average price of \$36.02 per barrel for 1981, \$31.69 per barrel for 1982, and \$29.08 per barrel for 1983.^emay not add up because of independent rounding.^fMonroe County produced a very small amount (304 bbl) in 1982; Platt County, 477 bbls in 1982 and 246 bbls in 1981.

TABLE 14. Illinois crude oil production, by major field^a, 1981-83^b

Field	County	1981		1982		1981-82 Change (%)	1983		1982-83 Change (%)
		Production (1000 bbl)	% of Illinois total	Production (1000 bbl)	% of Illinois total		Production (1000 bbl)	% of Illinois total	
Southeastern Illinois	Wabash Lawrence Crawford Clark Cumberland Jasper	4,005.5	15.7	4,258.0	15.4	- 6.3	4,851.4	16.6	+13.9
Clay City Consolidated	Clay Wayne Richland Jasper	3,463.9	13.6	3,332.3	12.0	+ 3.8	3,222.4	11.0	- 3.3
Salem	Marion Jefferson	1,702.9	6.7	2,269.8	8.2	-33.3	2,283.7	7.8	- 0.6
Louden	Fayette Effingham	1,681.0	6.6	1,664.0	6.0	+ 1.0	1,762.5	6.0	+ 5.9
New Harmony Consolidated	White Wabash Edwards	1,543.7	6.1	1,521.1	5.5	+ 1.5	1,617.8	5.5	+ 6.4
Sailor Springs Consolidated	Clay Jasper Effingham	585.3	2.3	595.5	2.2	- 1.7	598.5	2.1	+ 0.5
Phillipstown Consolidated	White Edwards	490.9	1.9	491.6	1.8	- 0.1	651.5	2.2	+32.5
Dale Consolidated	Franklin Hamilton Saline	381.2	1.5	369.9	1.3	+ 3.0	324.4	1.1	-12.3
Roland Consolidated	White Gallatin	380.8	1.5	341.6	1.2	+10.3	361.5	1.2	+ 5.8
Johnsonville Consolidated	Wayne	363.8	1.4	287.7	1.0	+20.9	263.0	0.9	- 8.6
Herald Consolidated	White Gallatin	319.3	1.2	499.6	1.8	-56.5	391.7	1.4	-21.6
Maple Grove Consolidated	Edwards Wayne	289.9	1.1	--	--	--	--	--	--
Nashville North	Washington	289.8	1.1	--	--	--	--	--	--
Albion Consolidated	Edwards White	260.0	1.0	311.6	1.1	-19.9	559.4	1.9	+79.5
Keenville	Wayne	245.3	1.0	223.1	0.8	+ 9.0	--	--	--
Mill Shoals	Hamilton Wayne White	239.3	0.9	204.5	0.7	+14.5	--	--	--
Maple Grove South Consolidated	Edwards	221.1	0.9	249.8	0.9	-13.0	--	--	--
Storms Consolidated	White	218.8	0.9	--	--	--	--	--	--
Divide Consolidated	Jefferson	202.3	0.8	--	--	--	--	--	--
Buckhorn East	Brown	--	--	383.4	1.4	--	693.2	2.4	+80.8
Parkersburg Consolidated	Richland Edwards	--	--	306.2	1.1	--	282.7	1.0	- 7.7
Goldengate Consolidated	Wayne White	--	--	275.4	1.0	--	228.8	0.8	-16.9
Hidalgo South	Jasper	--	--	241.6	0.9	--	--	--	--
Iola Consolidated	Clay Effingham	--	--	225.6	0.8	--	--	--	--
Harristown	Macon	--	--	202.3	0.7	--	--	--	--
St. James	Fayette	--	--	--	--	--	300.4	1.0	--
Benton	Franklin	--	--	--	--	--	269.8	0.9	--
Ewing East	Franklin	--	--	--	--	--	247.0	0.9	--
		16,884.6	66.2	18,254.7	65.8	- 8.1	18,909.6	64.7	+ 3.6

^aSource: Illinois State Geological Survey Oil and Gas Section.^bMajor fields are fields producing more than 200,000 bbl/year.

In Illinois, each oil field producing more than 200,000 barrels is considered a major field; their number increased from 19 in 1981 to 21 in 1982, but fell to 18 in 1983. Considered together, the major oil fields contributed about two-thirds of the annual oil production of the state in each year (table 14). As the five largest fields, South-eastern Illinois, Clay City Consolidated, Salem Consolidated, Loudon, and New Harmony Consolidated accounted for nearly one-half of the state's total oil production in Illinois in the 1981-83 period.

Historically, crude oil production reached a peak of 146.8 million barrels in 1940. Some years showed slight increases in oil production, but in general, production by primary recovery methods declined until 1974 (fig. 6). Since 1974, production by primary recovery has been increasing slightly. Waterflooding together with the introduction of the hydrofrac (hydraulic fracturing) method helped increase Illinois oil production from 1954 through 1962. Since 1962, both primary and secondary production has declined steadily as reserves have been depleted. The extent of this depletion can be seen by comparing the January 1956 reserves figure of 700 million barrels with the December 1983 figure of 135 million barrels. From 1979 through 1981, price decontrol caused a surge in the price

of crude oil, which added an incentive for exploration. Discoveries in the Illinois Basin resulted in additions to reserves in 1982 and 1983 and helped stabilize the reserves figures to some extent, although the generally downward trend continues.

Refineries According to the U.S. Department of Energy, eight refineries were operating in Illinois as of January 1, 1984, with a total capacity of 965,500 barrels per day, down 3.3 percent from January 1, 1983, and 5.7 percent from January 1, 1982.

Consumption Consumption of major petroleum products in Illinois has been declining since 1978. The trend continued to be downward for products other than gasoline in the past 3 years (table 15). Since 1981, gasoline consumption has remained steady, but kerosene consumption has declined 45 percent; distillate fuel oil, 10 percent; and residual fuel oil, 45 percent. The 1983 data on consumption of liquefied gases are not available; however, the data for 1981-82 indicated a decline of 28 percent. The only increase was in asphalt consumption in 1982, due to increased construction activity.

TABLE 15. Consumption of major petroleum products in Illinois, 1981-83

		1981	1982	1983
Gasoline ^a	thousand	109,476	107,675	109,746
(excluding naphtha)	bbl			
Kerosene ^b	thousand	666	439	368
	bbl			
Distillate fuel oil ^a	thousand	34,427	32,521	31,020
	bbl			
Residual fuel oil ^a	thousand	21,399	15,507	11,793
	bbl			
Liquefied gases ^b	thousand			
Propane	gal	540,432	495,566	NA
Butane	W	W	W	NA
Butane-propane mix	W	W	W	NA
Total		1,327,870	954,601	NA
Asphalt ^c	thousand	4,511	5,117	NA
	bbl			
Road oil ^c	thousand	28	24	NA
	bbl			

^aBasic Petroleum Data Book, American Petroleum Institute.

^bPetroleum Supply Annual, v. 1, U.S. Department of Energy, Office of Oil and Gas.

^cState Energy Data Report, DDE/EIA-D214.

NA = data not available at this time.

TABLE 16. Production of natural gas in Illinois, 1977-83^a

Year	Withdrawals (million cu ft)		Disposition (million cu ft)	
	Gas wells	Oil wells	Total	Marketed
1977	1,003.0	b	1,003	1,003
1978	958.5	200.5	1,159	1,159
1979	1,317.6	267.4	1,585	1,585
1980	1,333.6	240.4	1,574	1,574
1981	1,103.6	191.4	1,295	1,295
1982	993.5	168.5	1,162	1,162
1983	858.0	172.0	1,030	1,030

^asource: Illinois State Geological Survey, Oil and Gas Section.^bnot reported separately; included under gross withdrawals from gas wells.TABLE 17. Production of natural gas in Illinois, by field and county, 1981-83^a

Gas field	County	Production (million cu ft)			Change (%)	
		1981	1982	1983	1981-82	1982-83
Eldorado East	Gallatin	12.4	8.3	11.7	- 32.8	+ 41.0
Harco South	Saline	8.7	0.4	2.3	- 95.7	+503.2
Mattoon	Coles	434.3	389.2	285.4	- 10.4	- 26.7
Raleigh	Saline	7.7	NP ^c	20.1	--	--
Stubblefield South	Bond	18.5	9.2	3.3	- 50.2	- 64.1
Mine Gas	Saline	66.4	50.4	63.6	- 24.1	+ 26.3
Keenville	Wayne	178.6	164.3	134.0	- 8.0	- 18.4
New Athens	St. Clair	70.2	54.3	34.3	- 22.7	- 36.8
Louden	Fayette					
	Effingham	12.9	4.3	38.1	- 66.9	+795.0
St. Jacob East	Madison	5.3	4.0	4.7	- 24.2	+ 17.5
Albion Consolidated	Edwards	--	3.3	6.1	--	+ 85.3
Waggoner	Montgomery	15.0	15.0	20.3	--	+ 35.4
Eldorado Consol	Saline	3.1	NP ^c	NP ^c	--	--
Eden	Randolph	3.6	2.0	1.3	- 44.0	- 35.0
Grandview-Inclose	Edgar	85.3	58.9	57.9	- 31.0	- 1.8
St. Libory	St. Clair	74.4	41.8	50.0	- 43.8	+ 19.6
Fishhook	Pike	293.3	297.8	243.5	+ 1.5	- 18.2
Johnson City East	Williamson	5.5	58.5	1.6	+971.1	- 97.3
Pittsburgh	Williamson	--	--	52.0	--	--
TOTAL ^b		1,294.9	1,161.6	1,030.2	- 10.3	- 11.3

^asource: Illinois State Geological Survey.^btotals may not add up because of rounding.^cno production.

Natural Gas

Production Natural gas production in Illinois has been on the decline since 1979 (table 16). From 1981 to 1983 the decline was about 20 percent. Nearly half of this decline resulted from falling production in the Mattoon field in Coles County; yet Coles County remains the top gas-producing county, followed by Pike and Wayne Counties (table 17). These three counties accounted for roughly two-thirds of Illinois gas production in 1983. During 1981-82, their share of total production was about 70 percent.

The average wellhead value of Illinois gas increased from \$2.47 per thousand cubic feet in 1981 to \$2.62 in 1982, and further increased to \$2.84 in 1983.

Consumption Natural gas consumption in Illinois decreased 2.5 percent in 1981, 6.4 percent in 1982, and 5.6 percent in 1983 (table 18). Industries and utilities experienced the largest declines, caused mainly by higher gas prices. The increased usage of gas by utilities in 1983 was probably due to a combination of moderate price increases and greater availability in the market. The average value of natural gas consumed in Illinois rose 18 percent from \$3.84 per thousand cubic feet in 1981 to \$4.53 per thousand feet in 1982. The price increase in 1983 to \$5.17 per thousand cubic feet was about 14.1 percent. Figure 7 shows the natural gas consumption trends in Illinois since 1970.

TABLE 18. Consumption of natural gas in Illinois by consumer class, 1981-83^a

Consumer class	1981		1982		1981-82 change (%)	1983		1982-83 change (%)
	Quantity (million cu ft)	% of total consumption	Quantity (million cu ft)	% of total consumption		Quantity (million cu ft)	% of total consumption	
Residential	467,398	44.0	458,572	46.1	- 1.9	430,606	45.9	- 6.1
Commercial	221,132	20.8	218,751	22.0	- 1.1	204,834	21.8	- 6.4
Industrial	345,796	32.6	286,835	28.9	-17.1	276,533	29.5	- 3.6
Electric utilities	13,166	1.3	10,387	1.0	-21.1	11,948	1.3	+15.0
Other consumers	2,295	0.2	--	--	--	--	--	--
Total delivered ^b to consumers	1,049,787	98.9	974,545	98.0	- 7.2	923,921	98.5	- 5.2
Other uses ^c	12,170	1.1	19,634	2.0	+61.3	14,419	1.5	-26.6
Total consumption	1,061,957	100.0	994,179	100.0	- 6.4	938,340	100.0	- 5.6

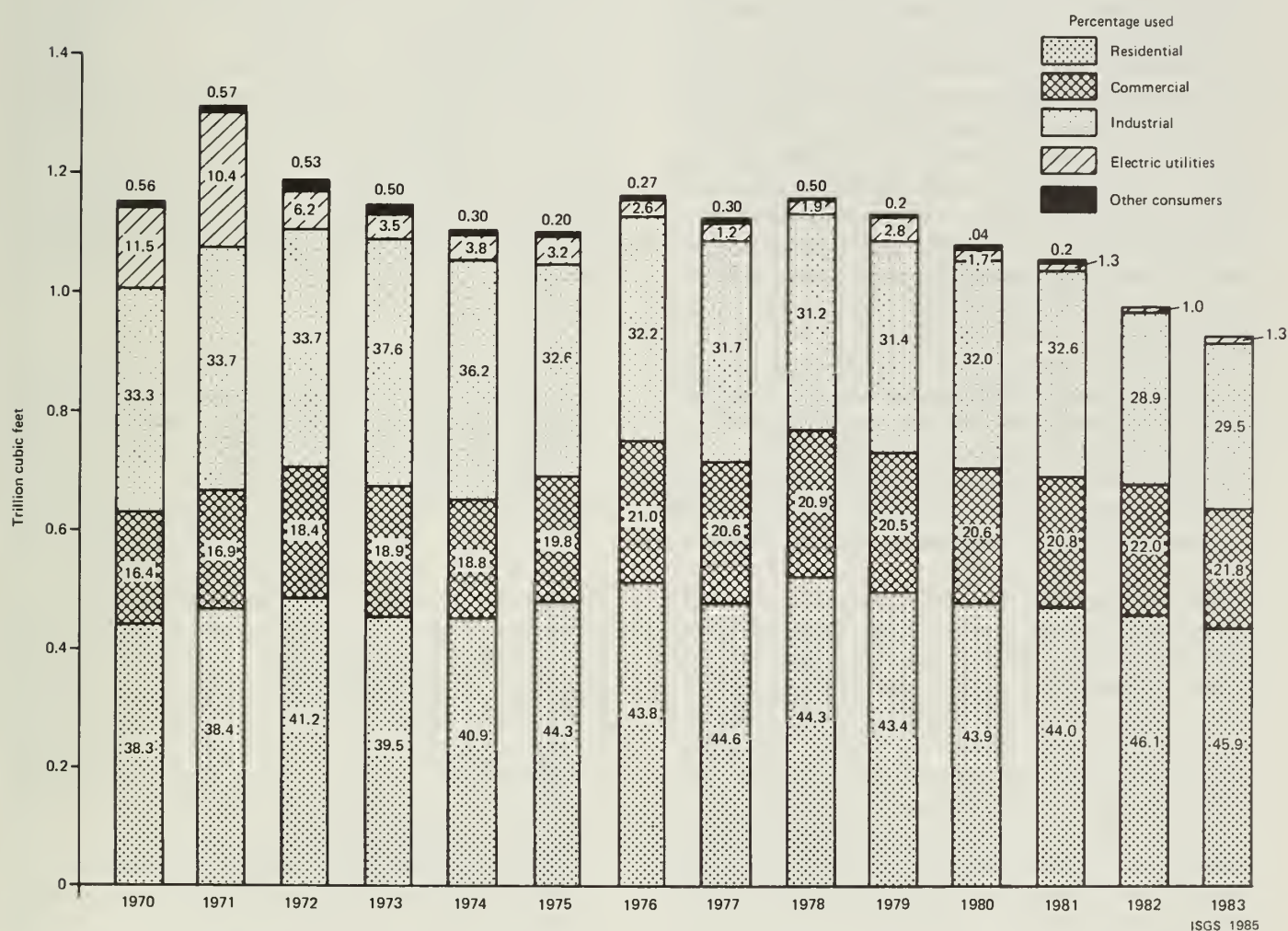
^asource: U.S. Department of Energy.^bincludes municipalities and public authorities that use natural gas for institutional heating, street lighting, and other purposes.^cincludes lease and plant fuel, pipeline fuel, and extraction loss.

Figure 7 Consumption of natural gas, 1970-83.

INDUSTRIAL AND CONSTRUCTION MATERIALS

Clays

Production Common clay, refractory or fire clay, and absorbent clay (fuller's earth) are mined in Illinois. In 1983, Illinois ranked 14 of 44 clay-producing states, up from 19 in 1982. Clay production (excluding fuller's earth) increased by 123 percent between 1981 and 1983, after continually declining for 8 years due to strong competition from low-cost out-of-state producers. Total clay production was 717,000 tons in 1983, 454,519 tons in 1982, and 321,745 tons in 1981 (fig. 8). Since 1979, data on refractory clay have been withheld for reasons of confidentiality. Most clay produced in Illinois was common clay, although very small amounts of refractory and absorbent clays were also produced.

The average unit value of common clay increased from \$4.31 per ton in 1981 to \$4.89 in 1982, but decreased to \$4.68 in 1983; the price of refractory clays increased from \$11.41 per ton in 1981 to \$12.54 per ton in 1982. There was no production of refractory clays reported for 1983. The total value of clays in 1983 was \$3,359,537, compared to \$2,305,455 in 1982 and \$1,540,081 in 1981.

The number of counties mining clay in Illinois declined from 9 in 1981 and 1982 to 6 in 1983. Livingston County has emerged as the most important clay producer in the state; its production increased from about 100,000 tons in 1981 to about 550,000 tons in 1983 and accounted for 77 percent of the state's clay production in 1983. Fewer but larger operations are producing clay; the number declined from 12 in 1981 to 8 in 1983. The number of active companies has also declined, from 10 to 8 during this period.

Absorbent clay was produced only in Pulaski County by two companies. The 1981 production was 6 percent less than in previous years but recovered in 1982 and 1983 to 6.8 percent and 13.2 percent, respectively. Refractory clay, which was mined only in Grundy County by one company in 1981 and 1982, declined by more than 50 percent from 1981 to 1982 and ceased completely in 1983.

Consumption and uses Manufacturers of bricks, sewer pipes, drain tiles, wall tiles, dinnerware, lightweight aggregates, and cements are the principal users of common clays and shales mined in Illinois. Building bricks have become the prime product using 80 percent of Illinois clay in 1982 and 1983, up from 48 percent in 1981. Note that 1983 clay production was about 58 percent and 123 percent higher than in 1982 and 1981, respectively.

The use of common clay for the production of portland cement, structural concrete, concrete blocks, and highway surfacing increased from about 54,000 tons in 1981 to about 98,000 tons in 1983. Sewer pipe and drain tile manufacturing consumed declining amounts of clay—110,000 tons in 1981, 44,500 tons in 1982, and 48,000 tons in 1983.

Refractory clay was used for manufacturing refractory brick, stoneware, and other clay products in 1981 and 1982. In 1983, no production was reported.

Absorbent clay from Pulaski County is used in the production of animal litter and oil and grease absorbents.

Fluorspar

Production and shipments Shipments of finished fluorspar from domestic mining operations were at their lowest level in 50 years. Fluorspar production in the United States declined drastically from 115,000 tons in 1981 to 77,000 tons in 1982, then to an estimated 61,000 tons in 1983. Illinois continues to be the nation's leading producer, supplying more than 90 percent of the total U.S. production. The main reason for the decline in fluorspar production was the decline in demand due to the recession in the U.S. steel industry. Low-priced Mexican fluorspar imports have also affected domestic production. In 1983, only 9.9 percent of apparent U.S. consumption of fluorspar was domestically produced. Illinois production increased 22.7 percent in 1981, but decreased 30.7 percent in 1982 and 19.5 percent in 1983. Individual company data are confidential and cannot be released.

Near Cave-in-Rock, Hastie Mining Company operated a surface mine producing metallurgical gravel spar and construction aggregate. Inverness operated the underground mines formerly owned by Allied Chemical Company, including a preparation plant using heavy media and flotation. Ozark-Mahoning operated four mines, two heavy media plants, a flotation mill, and maintained shipping facilities.

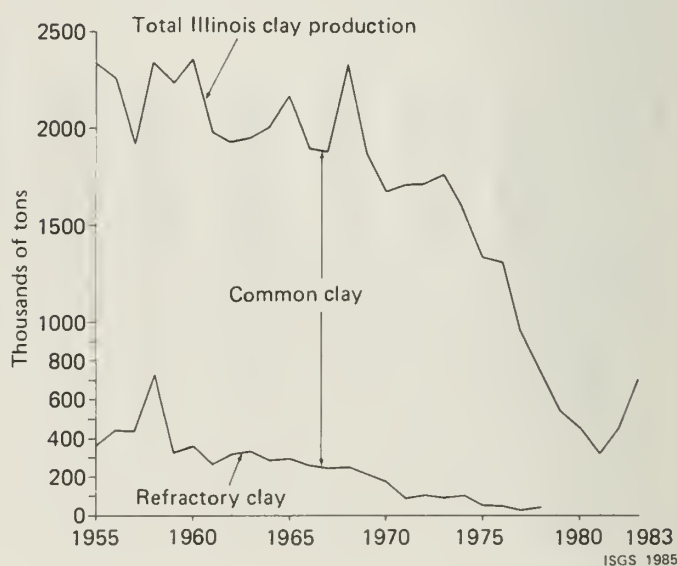


Figure 8 Trends in clay production, 1955-83.

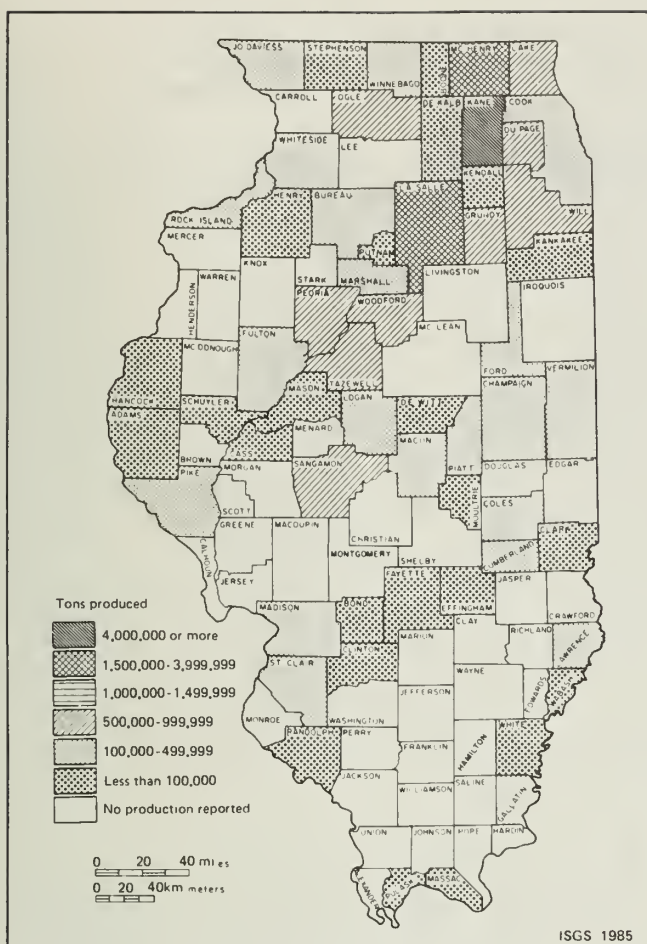


Figure 9 Sand and gravel production by county, 1983.

Consumption Reported consumption of fluorspar in the United States decreased 43 percent from 932,855 tons in 1981 to 530,565 tons in 1982, but increased slightly to about 560,000 tons in 1983. The apparent U.S. consumption (production + imports - exports \pm change in stocks) also decreased from 897,571 tons in 1981 to 618,493 tons in 1982 and 613,705 tons in 1983.

Consumption of fluorspar in Illinois fell both in absolute as well as relative terms between 1981 and 1983. Absolute consumption declined from 31,147 tons in 1981 to about 12,561 tons in 1983. Relative to the nation's fluorspar consumption, Illinois used about 3.5 percent in 1981 but only 2 percent in 1983. Fluorspar is used as a flux in raw steel production, which in 1982 was down 45 percent from 1981, then increased 6 percent in 1983. Fluorspar is also used in the production of hydrofluoric acid, fluorocarbon gases and plastics, sodium and aluminum fluorides (aluminum production), and other miscellaneous chemicals with a wide variety of additional uses. The decrease in consumption was also due to the reduced demand for fluorine materials by the aluminum industries, due both to economic conditions and to increased recycling in the aluminum industry.

Sand and gravel

To reduce reporting burdens and costs, the U.S. Bureau of Mines implemented new canvassing procedures for sand and gravel producers in 1981; surveys will be conducted in even-numbered years only. For odd-numbered years, only preliminary estimates will be published.

Production Deposits of sand and gravel are widely distributed through Illinois. Glacial deposits, chiefly valley trains and outwash plains, are the principal source of commercial sand and gravel. In 1982, Illinois ranked fifth nationally in the production of sand and gravel for construction purposes: Illinois produced 9.4 million tons of sand (excluding industrial sand), 10.2 million tons of gravel, and 1.9 million tons of unprocessed sand and gravel (table 19). The combined value of these mineral materials was \$59.1 million, a 14.2 percent decrease from the 1981 level. In 1983 production of sand and gravel was estimated at 21.1 million tons and valued at \$58.4 million.

The industrial sand production of Illinois ranked first in the nation in 1981 and 1982. The 1981 production of 4.6 million tons was worth \$49.2 million, and the 1982 production of about 4 million tons was valued at \$45.7 million; in 1983 the estimate was 4 million tons valued at \$42.9 million. Five companies operating in La Salle and Ogle Counties reported this production. The unit value increased from \$10.59 in 1981 to \$11.45 in 1982, but decreased to \$10.94 in 1983.

Fifty-eight counties produced sand and gravel in 1982 (fig. 9); 143 companies worked 197 deposits (as compared with 180 companies working 205 deposits in 1980). Total sand and gravel production decreased 4.3 million tons or 14.3 percent from the 1981 level (fig. 10). This was the second consecutive decline in production.

The size of operations is trending toward 400,000 tons per year to 999,999 tons per year. The number of very large and very small operations decreased in 1982 as compared with 1980. Pits producing more than 300,000 tons per year, which included 12 percent of all pits in 1980 and 14 percent in 1982, supplied about 56 percent of each year's total production; whereas pits producing less than 50,000 tons, which included about 40 percent of all the pits, accounted for less than 6 percent of the annual production in both 1980 and 1982 (table 20). At the same time, pits larger than 1 million tons per year (six in 1980) were not reported in 1982.

Transportation Due to its low unit price, most sand and gravel is shipped no farther than about 50 miles from the pit. In 1982, 87.5 percent of all shipments were by truck; the remaining 12.5 percent were either shipped by railroad and waterway, or not transported (table 19).

Consumption and uses Illinois sand and gravel is primarily used as construction aggregate. The slowdown in construction activity due to the recession resulted in a rapid decline

TABLE 19. Sand and gravel produced and mode of transportation, by county, 1982^a

County	No. of companies	No. of operations	Quantity (1000 tons)				Total produced	Value (\$1000)	Mode of shipment			
			Sand	Gravel	Industrial sand	Sand and gravel unprocessed			Truck	Rail	Barge	Not transported
Adams	2	2	W	W	--	--	W	W	W	--	--	W
Bond	2	2	W	W	--	W	W	W	W	--	--	--
Boone	1	1	58	33	--	--	91	267	91	--	--	--
Bureau	3	3	W	W	--	--	157	475	157	--	--	--
Cass	1	2	--	c	--	--	c	c	c	--	--	--
Champaign	5	6	254	82	--	110	446	1,422	446	--	--	--
Clark	2	2	W	W	--	--	W	W	W	--	--	W
Clinton	2	2	--	--	--	W	W	W	W	--	--	--
Coles	2	3	W	W	--	W	W	W	W	--	--	--
Cook	2	2	W	W	--	W	W	W	W	--	--	--
Cumberland	1	1	45	46	--	10	101	248	--	--	--	101
De Kalb	3	6	W	W	--	W	93	293	92	--	--	1
De Witt	1	1	3	32	--	--	35	139	35	--	--	--
Du Page	2	3	W	W	--	W	W	W	W	--	--	--
Effingham	1	1	W	--	--	--	W	W	W	--	--	--
Fayette	1	1	W	W	--	--	W	W	W	--	--	--
Ford	2	3	W	W	--	W	W	W	W	--	--	W
Fulton	1	1	W	W	--	W	W	W	W	--	--	--
Gallatin	1	1	W	W	--	--	W	W	--	--	W	--
Grundy	1	1	W	--	--	--	W	W	--	--	W	--
Hancock	1	1	W	W	--	--	W	W	W	--	--	--
Henry	1	1	--	--	--	W	W	W	W	--	--	--
Jo Daviess	1	1	23	122	--	48	193	373	112	--	--	81
Kane	7	12	1,845	2,786	--	265	4,896	13,551	W	--	--	W
Kankakee	1	1	W	--	--	--	W	W	W	--	--	--
Kendall	2	2	W	W	--	--	W	W	W	--	--	--
Lake	2	2	W	W	--	W	W	W	W	--	--	--
La Salle	10	13	W	W	W	W	3,711	41,842	W	W	--	--
Lawrence	2	1	W	W	--	W	W	W	W	--	--	--
Logan	3	3	W	W	--	W	335	833	335	--	--	--
McHenry	15	16	1,804	1,724	--	87	3,615	9,663	W	--	--	W
McLean	4	6	153	487	--	64	704	2,441	704	--	--	--
Macon	2	2	W	W	--	W	W	W	W	--	--	--
Madison	2	2	W	W	--	--	W	W	W	--	--	--
Marshall	1	4	W	W	--	W	W	W	W	--	--	--
Mason	2	2	W	--	--	W	W	W	W	--	--	--
Massac	1	3	--	--	--	27	27	37	27	--	--	--
Moultrie	1	1	--	--	--	W	W	W	W	--	--	--
Ogle	1	1	--	--	W	--	W	W	W	W	--	--
Peoria	5	6	94	375	--	57	526	1,030	W	--	--	W
Piatt	2	21	78	15	--	31	124	377	124	--	--	--
Pike	1	1	W	W	--	--	W	W	W	--	--	--
Pulaski	1	1	W	--	--	--	W	W	--	--	W	--
Putnam	3	3	--	W	--	W	19	41	19	--	--	--
Randolph	1	1	W	--	--	--	W	W	W	--	--	--
Rock Island	1	3	W	W	--	--	W	W	W	--	--	--
St. Clair	1	1	W	W	--	W	W	W	W	--	--	--
Sangamon	4	4	409	168	--	124	701	2,418	W	--	--	W
Schuyler	1	1	15	55	--	--	70	245	70	--	--	--
Stephenson	2	2	W	W	--	W	W	W	W	--	--	W
Tazewell	3	10	221	289	--	88	598	2,053	W	--	--	W
Vermilion	3	3	--	W	--	W	104	238	W	--	--	W
Wabash	2	2	W	W	--	--	W	W	W	--	--	W
White	1	1	W	W	--	--	W	W	--	--	--	W
Whiteside	3	3	W	W	--	W	212	605	212	--	--	--
Will	6	6	187	647	--	55	889	2,708	889	--	--	--
Winnebago	3	3	54	85	--	20	159	345	141	--	--	18
Woodford	5	7	130	403	--	117	650	2,239	527	--	--	123
Concealments	--	--	4,012	2,882	3,989	839	7,091	20,926	18,381	2,205 ^b		655
Total ^d	143	197	9,385	10,231	3,989	1,942	25,547	104,813	22,363	2,205 ^b		978

^asource: U.S. Bureau of Mines.^brail and barge added together to conceal individual company data.^camount produced is under 500 tons; total value is under \$500.^dtotals may not add up to amounts shown because of independent rounding.

W = Withheld included in concealments.

TABLE 20. Illinois sand and gravel production, by size of operation, 1980 and 1982^a

Size of operation (tons/year)	1980 ^b			1982		
	No. of operations	Production (tons)	% of commercial production	No. of operations	Production (tons)	% of commercial production
less than 25,000	61	689,421	2.2	41	423,242	1.7
25,000 to 49,999	27	1,027,699	3.2	27	956,021	3.7
50,000 to 99,999	31	2,209,006	7.0	34	2,436,019	9.5
100,000 to 199,999	50	7,161,363	22.6	31	4,488,822	17.6
200,000 to 299,999	12	2,943,074	9.3	12	3,045,755	11.9
300,000 to 399,999	6	2,003,423	6.3	6	2,064,251	8.1
400,000 to 499,999	1	2,076,524 ^c	6.5	3		15.5
500,000 to 599,999	3			4	3,957,140 ^c	
600,000 to 699,999	3	3,480,219 ^c	11.0	1		
700,000 to 799,999	2			4		
800,000 to 899,999	2	2,695,375 ^c	8.5	3	8,135,380 ^c	32.0
900,000 to 999,999	1			3		
1,000,000 and over	6	7,438,871	23.4	0		
TOTAL	205	31,724,975	100.0	169	25,546,630	100.0

^asource: U.S. Bureau of Mines.^b1981 information not available.^cmine tonnage must be combined to avoid disclosing confidential data.

in consumption of construction aggregates between 1980 and 1982. Use of sand and gravel declined over 20 percent in quantity and nearly 25 percent in dollar value (table 21).

Industrial silica sand was produced in two forms: ground and unground. Unground sand was used primarily for glass manufacturing; molding, blasting, grinding, and polishing sand; railroad traction sand; filtration sand; and propping sand for hydrofracturing of oil wells. Ground sand was used in chemicals, abrasives, enamels, pottery, porcelain, tile, and various fillers. Consumption of silica sand in 1981 was unchanged from the 1980 level, but it decreased 14.1 percent in 1982, reflecting the overall slowdown in industrial activity (table 21). In 1983, silica sand consumption increased 1.8 percent.

Stone

The U.S. Bureau of Mines now canvasses data on stone production every odd-numbered year. Consequently, only estimates for 1982 are included in this report.

Production In 1983, the total value of Illinois stone production increased to \$166.9 million from the estimated \$148.3 million in 1982 and \$165.2 million in 1981 (table 22). Crushed stone production was 42.8 million tons in 1983, slightly less than the estimated 42.9 million tons in 1982, and a 2.9 percent decrease from 44.2 million in 1981. Illinois ranked fourth in the nation, behind Texas, Florida, and Pennsylvania, in stone production for 1981 and 1983.

In 1983, the Fox River Stone Company in Kane

County produced 1,836 tons of dimension stone (quarried and prepared in blocks to specifications) valued at \$70,747. An estimated 2,000 tons of dimension stone with a value of \$98,000 was produced in 1982, an increase of 17 percent in quantity (1,712 tons) and 15 percent in value (\$85,000) over 1981.

In 1981, 57 Illinois counties reported stone production (fig. 11); three counties, Brown, Bureau and Clinton, did not report in 1983. The number of limestone and dolomite quarries operating in 1981 remained at 196, unchanged from 1980; however, total production declined by 17 percent. In 1983, the number of quarries operating dropped to 169. The eight largest quarries (900,000 tons per year) accounted for 39 percent of production in 1981, while the 57 smallest producers (25,000 tons per year) accounted for only 1.2 percent of production. Overall, large operators dominate: the top 10 percent provided about 56 percent of all stone production in 1981 as well as in 1983 (table 23).

Shipments About 90 percent of Illinois stone is shipped by truck for only short distances (table 22). Shipments of stone, a bulk commodity, are confined primarily to areas near the quarry. Illinois waterways are used by some producers; for example, about 38 percent of the Will County production was shipped by water in 1981 and 30 percent in 1983. About 4 percent of the statewide production of stone in 1981 and 6 percent in 1983 was shipped by water. On a statewide basis in both 1981 and 1983, 6 percent of Illinois' stone production was transported by other means, such as railway (3 percent).

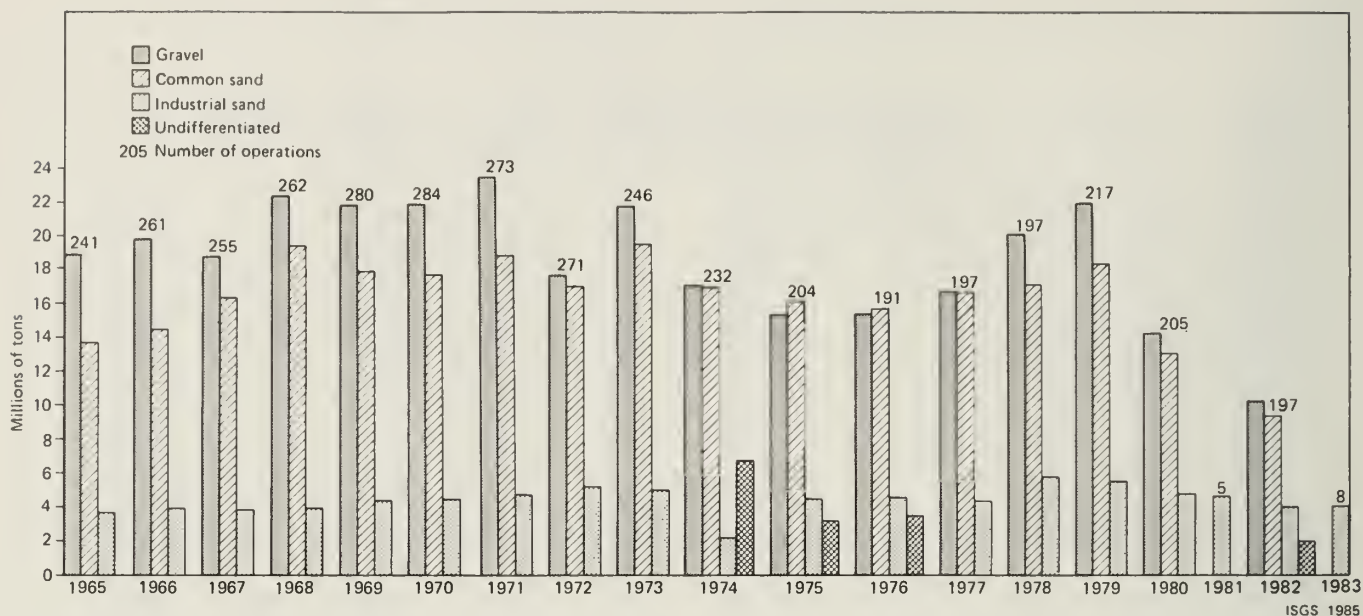


Figure 10 Trends in production of sand and gravel, 1965-83.

Consumption and uses About three-fourths of Illinois stone is used for construction aggregate, about 15 percent for chemical purposes, and 10 percent for agriculture (fig. 12; table 24). The single largest use was as road base stone—about 31 percent of the total in 1981 and 20 percent in 1983. Other specific uses are listed in table 24. The pattern of usage has not changed much from 1980, although the total consumption trend is directed downward.

Of the dimension stone mined in 1981, 40 percent was used as veneer in house construction in Illinois; rubble accounted for 33 percent, and flagging for 27 percent. 1983 sales were as follows: cut stone or veneer 24.1 percent, flagging 8.5 percent, and irregularly shaped stone or rubble 67.4 percent.

Tripoli (amorphous silica)

Production The term "tripoli" refers to several fine-grained, porous, siliceous materials. Two of the nation's tripoli producers are located in Alexander County in southern Illinois: Illinois Minerals Company and Tammsco Inc. Illinois continues to be the nation's largest producer of these siliceous materials, accounting for more than half the total U.S. production in 1981, 1982, and 1983. Actual production cannot be revealed for reasons of confidentiality; however, Illinois crude production increased by 9 percent from 1982 to 1983, and by 2.4 percent from 1981 to 1982.

The tripoli deposits in Alexander County belong to the Devonian Clear Creek Formation and the Grassy Knob Formation below it. These almost horizontal deposits are up to 30 feet thick. The iron staining at the top and the base dictate the cut-off point for commercial grades.

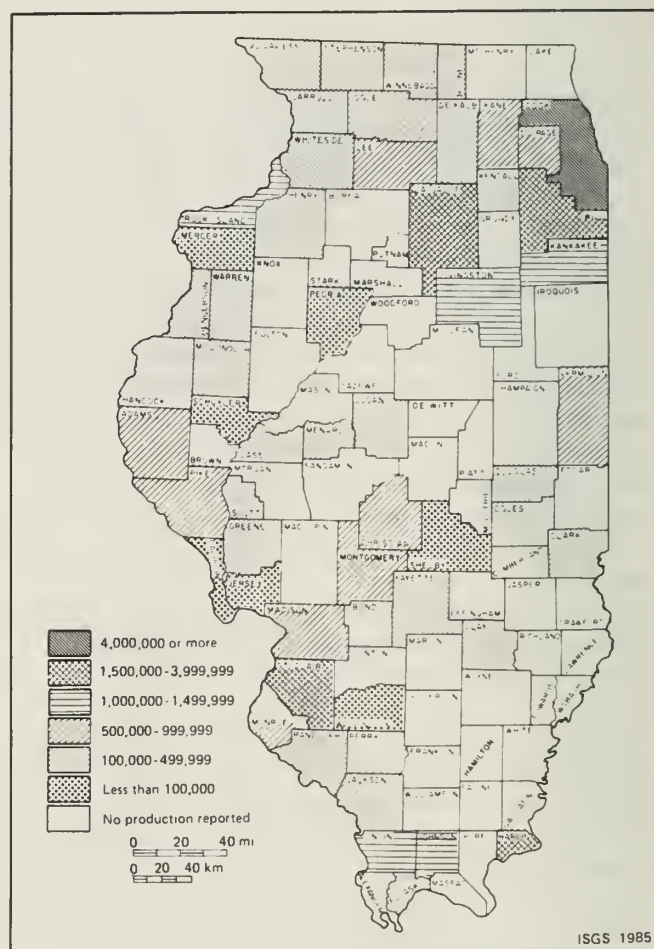


Figure 11 Stone production by county, 1983.

TABLE 21. Illinois sand and gravel sold or used by producers, by class of operation and use, 1980-82

	1980		1981		1982		1980-82 change in quantity (%)	1980-82 change in value (%)	1981-82 change in quantity (%)	1981-82 change in value (%)
	Quantity (1000 tons)	Value (\$1000)	Quantity (1000 tons)	Value (\$1000)	Quantity (1000 tons)	Value (\$1000)				
Construction aggregates										
Sand and gravel operations										
Building	12,565	35,599	NA	NA	9,646	27,163	- 23.2	-23.7	--	--
Paving	10,880	33,094	NA	NA	8,967	25,212	- 17.6	-23.8	--	--
Fill	3,452	8,873	NA	NA	2,510	5,062	- 27.3	-43.0	--	--
Other uses ^a	197	944	NA	NA	435	1,712	+120.8	+81.4	--	--
Total ^b	27,094	78,510	23,900	69,800	21,558	59,148	- 20.4	-24.7	-9.8	-15.3
Industrial sand										
Blast	-- ^d	-- ^d	-- ^d	-- ^d	-- ^d	-- ^d				
Molding	1,373	13,378	1,574	13,549	1,360	12,674	- 0.9	- 5.3	-13.6	- 6.5
Glass	2,087	15,416	2,000	15,253	1,790	18,456	- 14.2	+19.7	-10.5	+21.0
Other uses ^c	1,172	15,028	1,072	20,384	839	14,535	- 28.4	- 3.3	-21.7	-28.7
Total ^b	4,631	43,822	4,646	49,186	3,989	45,665	- 13.9	+ 4.2	-14.1	- 7.2
Total sand and gravel ^b	31,725	122,332	28,546	118,986	25,547	104,813	- 19.5	-14.3	-10.5	-11.9

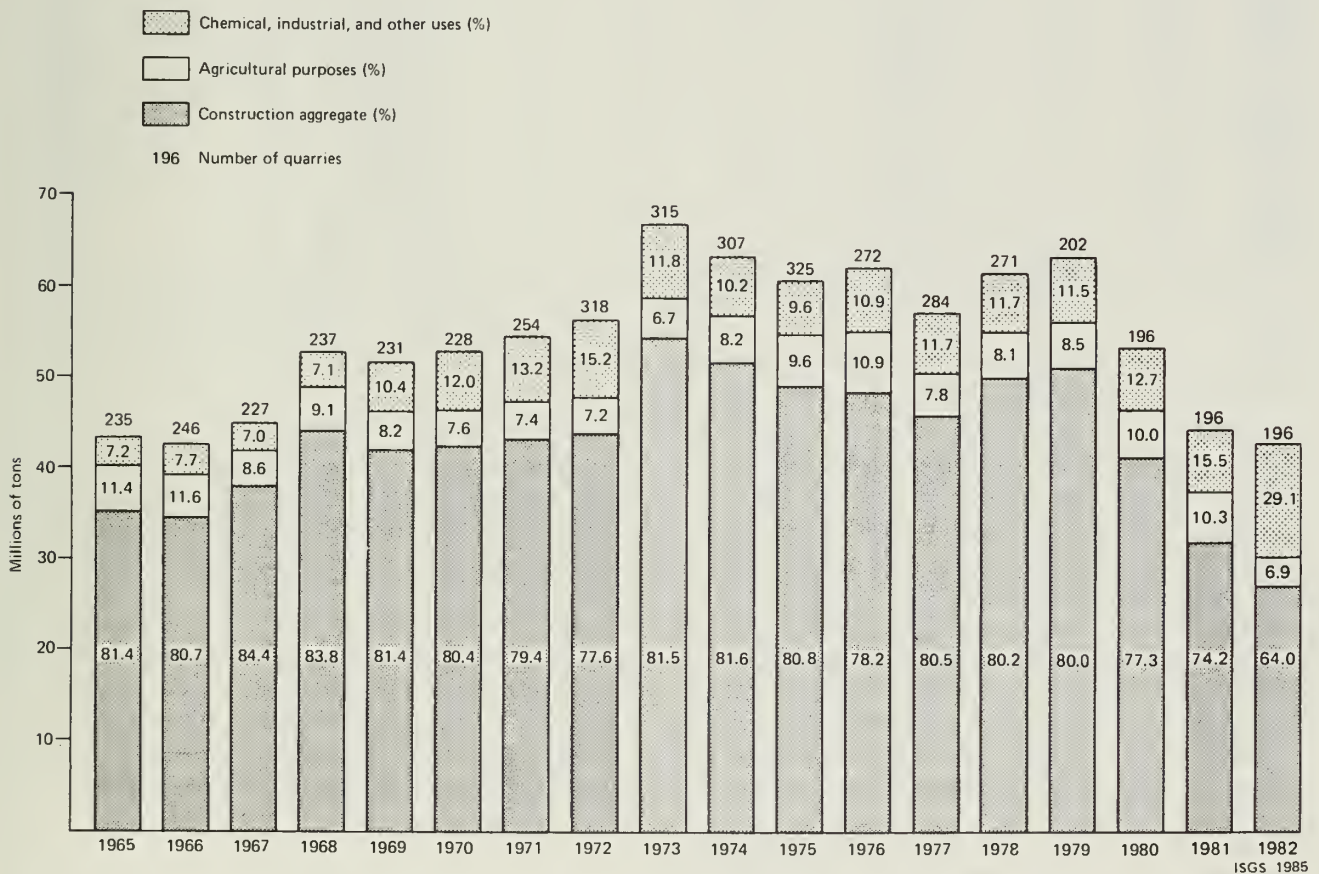
^aincludes railroad ballast.^bnumbers are rounded and totals may not add up.^cincludes engine, filtration, foundry use, grinding and polishing, oil hydrofrac, pottery, abrasives, chemicals, enamel, and other uses.^dincluded with other uses to conceal.

Figure 12 Trends in uses of crushed and broken stone produced in Illinois, 1965-83. Data for 1982 are not available.

TABLE 22. Production and value of Illinois stone, by county and mode of transportation, 1981 and 1983^a

County	1981							1983						
	No. of quarries	Quantity (1000 tons)	Value (\$1000)	Mode of transportation				No. of quarries	Quantity (1000 tons)	Value (\$1000)	Mode of transportation			
				Truck	Rail	Barge	Other				Truck	Rail	Barge	Other
Adams	9	1,040	12,410	777	237	26	--	6	880	14,503	687	193	--	--
Boone	2	W	W	W	--	--	--	3	103	385	103	--	--	--
Brown	1	100	441	100	--	--	--	--	--	--	--	--	--	--
Bureau	1	32	93	32	--	--	--	--	--	--	--	--	--	--
Calhoun	2	30	86	30	--	--	--	1	53	218	53	--	--	--
Carroll	8	241	748	220	--	--	21	6	205	688	168	--	--	37
Cass	1	78	228	78	--	--	--	1	W	W	W	--	--	--
Christian	1	W	W	W	--	--	--	1	W	W	W	--	--	--
Clark	2	W	W	W	--	--	--	2	W	W	W	--	--	--
Clay	1	W	W	W	--	--	--	1	249	1,033	249	--	--	--
Clinton	1	7	17	7	--	--	--	--	--	--	--	--	--	--
Coles	1	W	W	W	--	--	--	2	W	W	W	--	--	--
Cook	4	W	W	W	W	--	--	4	W	W	W	W	--	--
DeKalb	2	W	W	W	--	--	W ^b	2	W	W	W	--	--	--
Douglas	1	W	W	W	--	--	--	1	W	W	W	--	--	--
DuPage	1	W	W	W	--	--	--	1	795	3,267	795	--	--	--
Fayette	1	W	W	W	--	--	--	1	W	W	W	--	--	--
Greene	3	W	W	W	--	--	--	3	W	W	W	--	--	--
Hancock	4	454	1,417	454	--	--	--	4	400	1,624	400	--	--	--
Hardin	5	2,205	5,746	2,172	--	33	--	4	2,429	7,129	980	--	1,422	27
Henderson	3	W	W	W	--	--	--	3	W	W	W	--	--	W ^b
Henry	1	412	1,818	412	--	--	--	1	375	1,542	375	--	--	--
Jackson	1	W	W	W	--	--	--	1	W	W	W	--	--	--
Jersey	2	W	W	W	--	--	--	1	32	120	32	--	--	--
Jo Daviess	17	304	784	304	--	--	--	9	284	895	284	--	--	--
Johnson	2	W	W	W	W	--	--	2	W	W	W	W	--	--
Kane	3	743	3,036	743	--	--	--	3	725	2,837	725	--	--	--
Kankakee	3	W	W	W	W	--	--	3	1,200	4,789	950	250	--	--
Kendall	2	W	W	W	--	--	--	2	W	W	W	--	--	--
La Salle	5	2,152	6,450	1,527	--	--	625	4	2,130	7,305	1,500	--	--	630
Lee	9	1,076	2,962	942	--	--	135	8	776	2,464	461	--	--	315
Livingston	3	W	W	W	--	--	--	3	W	W	W	--	--	--
Logan	1	W	W	W	--	--	--	1	W	W	W	--	--	--
McDonough	2	W	W	W	--	--	--	2	W	W	W	--	--	--
Madison	3	770	2,819	770	--	--	--	3	780	W	780	--	--	--
Menard	1	W	W	W	--	--	--	1	W	W	W	--	--	--
Mercer	1	62	109	62	--	--	--	1	87	358	87	--	--	--
Monroe	2	W	W	W	W	--	--	2	W	W	W	W	--	--
Montgomery	4	663	2,250	663	--	--	--	4	631	2,604	631	--	--	--
Ogle	12	627	1,862	398	--	--	229	10	772	2,509	703	--	--	69
Peoria	1	173	657	173	--	--	--	1	77	331	77	--	--	--
Pike	5	518	1,962	518	--	--	--	5	737	2,509	731	6	--	--
Pulaski	1	W	W	W	W	--	--	1	W	W	W	W	--	--
Randolph	2	W	W	W	W	--	--	2	W	W	W	--	--	--
Rock Island	4	1,030	4,296	1,030	--	--	--	3	W	W	W	--	--	--
St. Clair	4	1,722	5,363	1,722	--	--	--	4	1,746	5,717	1,746	--	--	--
Schuyler	1	W	W	W	--	--	--	1	34	140	34	--	--	--
Scott	1	W	W	W	--	--	--	1	W	W	W	--	--	--
Shelby	1	35	128	35	--	--	--	1	27	112	27	--	--	--
Stephenson	11	252	751	252	--	--	--	12	395	956	395	--	--	--
Union	2	W	W	W	--	--	--	2	W	W	W	--	--	--
Vermilion	1	W	W	W	--	--	--	1	W	W	W	--	--	--
Warren	2	W	W	W	--	--	--	2	W	W	W	--	--	--
Washington	1	W	W	W	--	--	--	1	71	450	71	--	--	--
Whiteside	5	120	370	120	--	--	--	2	W	W	W	--	--	--
Will	8	3,917	14,337	2,288	138	1,491	--	7	3,669	13,025	2,431	1061	132	--
Winnebago	18	429	1,620	429	--	--	--	16	315	971	315	--	--	--
Concealments		24,965	92,458	23,882	1,083	--	b		22,783	88,377	21,934	848	--	--
Totals ^c	196	44,159	165,218	40,140	1,458	1,551	1,010	169	42,761	166,860	37,726	1,404	2,554	1,077

^asource: U.S. Bureau of Mines.^bincluded with rail to avoid disclosing individual company figures.^ctotals may not add to amounts shown because of independent rounding.

W = Withheld to avoid disclosing confidential data of individual companies, included in total.

TABLE 23. Illinois stone production by size of operation, 1981 and 1983^a

Size of operation (tons/year)	1981			1983		
	No. of quarries	Production ^a (tons)	% of total	No. of quarries	Production ^b (tons)	% of total
less than 25,000	57	547,668	1.2	39	423,400	1.0
25,000 to 49,999	27	981,080	2.2	22	780,283	1.8
50,000 to 74,999	14	861,763	2.0	11	702,887	1.6
75,000 to 99,999	14	1,238,740	2.8	10	882,882	2.1
100,000 to 199,999	24	3,676,730	8.3	33	4,949,805	11.6
200,000 to 299,999	24	5,936,566	13.5	17	4,085,284	9.6
300,000 to 399,999	9	3,186,717	7.2	11	3,834,844	9.0
400,000 to 499,999	7	3,084,717	7.0	7	3,199,549	7.5
500,000 to 599,999	6	3,219,299	7.3	6	3,428,213	8.0
600,000 to 699,999	4	2,488,035	5.6	3	1,859,194	4.3
700,000 to 799,999				2	1,560,760	3.6
800,000 to 899,999	2	1,618,237	3.7	2	1,691,378	4.0
900,000 and over	8	17,319,662	39.2	6	15,362,772	35.9
Total	196	44,159,214	100.0	169	42,761,251	100.0

^adue to the canvassing procedure used by the U.S. Bureau of Mines for the survey of stone, 1982 information will not be available. Source: U.S. Bureau of Mines.

^bexcludes dimension stone.

TABLE 24. Use of crushed and broken stone produced in Illinois, 1981 and 1983^c

Use	1981				1983			
	Total (tons)	% of total	1979-81 change (%)	Average value/ton	Total (tons)	% of total	1981-83 change (%)	Average value/ton
Road base stone	13,658,259	30.9	-17.7	3.50	8,607,689	20.1	- 37.0	3.35
Concrete aggregate	5,535,146	12.5	-23.5	3.68	3,714,604	8.7	- 32.9	3.62
Surface treatment aggregate	2,888,276	6.5	-18.6	3.51	1,375,008	3.2	- 52.4	3.58
Bituminous aggregate	4,362,231	9.9	-23.8	3.85	3,926,272	9.2	- 10.0	3.94
Unspecified construction	4,637,956	10.5	-23.0	3.40	3,315,440	7.8	- 28.5	3.09
Agricultural purposes ^b	4,522,609	10.3	-15.2	4.02	2,970,219	6.9	- 34.3	4.35
Cement	2,758,877	6.3	+ 6.2	2.21	2,828,596	6.6	+ 2.5	2.75
Macadam aggregate	1,717,148	3.9	-18.6	3.47	3,286,107	7.7	+ 91.4	3.48
Flux stone	618,663	1.4	+ 5.7	4.64	W	-	-	4.30
Riprap and jetty	388,371	0.9	-38.5	3.61	1,852,012	4.3	+376.9	3.77
Railroad ballast	942,871	2.1	+10.0	5.06	584,108	1.4	- 38.1	3.49
Other uses ^c	2,128,807	4.8	+ 3.5	6.95	10,301,196	24.1	+274.9	5.16
Total	44,159,214	100.0	-17.2	3.74	42,761,251	100.0	- 3.2	3.90

^adue to the new reporting procedure implemented by the U.S. Bureau of Mines, 1982 figures will not be available. The survey of stone producers will be conducted for odd-numbered years only. Source: U.S. Bureau of Mines.

^bincludes agricultural limestone and poultry grit.

^cincludes stone for asphalt filler, chemicals, lime manufacture, mine dusting, filler, roofing aggregate, fill, waste material, whitening, and other uses.

Consumption and uses The amorphous silica processed in Illinois has been used for both abrasives and filler. Other uses are being developed. In experiments at its cement plant in Missouri, the Lone Star Cement Company has been adding iron-stained tripoli, which supplies silica and iron, to its manufacturing process. Iron-stained tripoli has been regarded as waste rock unsuitable for mixing with the pure, white tripoli marketed by Illinois Minerals Company.

The quantity of processed materials sold in 1983 was 1.2 percent less than it had been in 1982; and the 1982 quantity was 2.7 percent less than it had been in 1981.

METALS

Zinc, Lead, Silver, and Germanium

Production Zinc, lead, silver, and germanium were recovered from fluorspar ore mined in Hardin and Pope Counties by Ozark-Mahoning and Inverness Mining Companies in

1981 and 1982, but only by Ozark-Mahoning Company in 1983. Output of zinc, lead, and silver increased considerably in 1981; however, during 1982 production declined along with the decline in fluorspar production. During 1983, production of zinc declined further, although lead production increased and silver stayed about the same. Small amounts of germanium have been produced intermittently over the last few years. Production data are not available for germanium, and actual production figures for zinc, lead, and silver are withheld to avoid disclosing individual company data.

OTHER MINERALS

Peat

Although peat is classified as a fuel by the U.S. Bureau of Mines, all commercial sales of peat in the United States (excluding imports) are for agricultural and horticultural

TABLE 25. Production and commercial sales of peat in Illinois, 1973-83^a

Year	No. of plants	Production (tons)	Commercial sales (tons)	Value (\$)	Average value/ton (\$)	Illinois Production ^b (%)
1973	6	71,552	71,551	1,037,000	14.49	11.28
1974	6	95,807	95,807	1,412,000	14.74	13.11
1975	6	96,295	95,719	1,511,401	15.79	12.48
1976	4	84,662	87,087	763,000	8.76	8.73
1977	6	80,355	82,356	1,477,595	17.94	10.24
1978	4	86,000	84,310	1,594,000	18.91	10.46
1979	5	87,209	85,544	1,610,084	19.12	10.57
1980	5	80,913	79,415	1,504,567	18.95	10.12
1981	5	47,775	45,834	1,502,118	32.77	6.05
1982	4	W	46,620	1,513,656	32.47	5.83 ^c
1983	5	W	W	W	W	W

^asource: U.S. Bureau of Mines.^bIllinois production as percentage of U.S. production.^cIllinois commercial sales as percentage of U.S. commercial sales.

W = withheld.

purposes, specifically for soil improvement. Three major kinds of peat—reed-sedge, moss, and peat humus—were produced in Illinois by five companies located in Cook, Lake, and Whiteside Counties. Production declined sharply in 1981 and 1982, although total sales value remained unchanged at about \$1.5 million annually (table 25). Then in 1983, production increased about 70 percent.

Among the 22 peat-producing states, Illinois ranked third after Michigan and Florida.

Gemstones

Limited to specimen-grade fluorite collected in the fluor-spar mines of Illinois, gemstones contributed little to the total value of mineral production. The estimated value of gemstones was only about \$15,000 annually in 1981, 1982, and 1983.

Primary barite

As an accessory mineral in fluorspar ore, barite has been recovered by a by-product of fluorspar mining operations in Hardin County since 1974. Barite is used primarily as a weighting agent in drilling muds. Other uses include the manufacture of paints, glass, rubber, and barium chemicals.

Barite production increased by 30 percent from 1980 to 1981, partly due to the start of the operation of the new Ozark-Mahoning Denton Mines. The only other company operating in Illinois in 1981 was the Inverness Mining Company; however, it shut down in 1982 and reported no barite production. The result was an 83 percent drop in Illinois production for 1982.

MINERAL MATERIALS PROCESSED

Mineral materials produced mainly in other states and in foreign countries but processed in Illinois include ground barite, columbium and tantalum, calcined gypsum, crude iodine, iron-oxide pigments, natural gas liquids, expanded perlite, pig iron, sulfur, exfoliated vermiculite, primary slab zinc, and secondary slab zinc.

Ground barite

The producers of ground barite are the Mineral Pigments and Metals Division of Pfizer, Inc. (St. Clair County), and the Ozark-Mahoning and Inverness Mining Companies (both in Hardin County). With the closing of Inverness, there will be only two producers in the state. The ground barite produced in Illinois is used almost exclusively as a filler or extender in paints.

Columbium and tantalum

Processing of columbium-tantalum concentrate imported from foreign countries was reported by Fansteel, Inc., of Cook County. Fansteel produced columbium, tantalum metal, and tantalum carbide. They also expanded their wire- and tube-making equipment at the North Chicago plant. Columbium and tantalum are used primarily in the production of various steel alloys. Production figures are not available.

Calcined gypsum

Calcined gypsum is used primarily to produce wallboard—a housing material. Due to a recession that decreased the demand for housing, the National Gypsum Company (Lake County) closed its wallboard production operation in 1982. Normal production for 1981 and a very small amount for 1982 were reported before the Waukegan plant was closed. In 1983, the National Gypsum Company reopened its plant, but production for 1983 did not attain 1981 levels.

Crude iodine

Crude iodine is used primarily as a catalyst, and as an additive in animal feed, inks, colorants, pharmaceuticals, and sanitary and industrial disinfectants. Crude iodine was processed into inorganic compounds for commercial use at three Illinois plants: Abbott Laboratories in Lake County, Economics Laboratory, Inc., in Will County, and West Argo-Chemicals in Lake County.

Iron-oxide pigments

Finished pigments were produced from iron ore imported from other states by the Prince Manufacturing Company in Adams County; the George B. Smith Chemical Works in Kane County; Pfizer, Inc., in St. Clair County; and Solomon Grinding Service in Sangamon County. In 1981, Illinois plants processed 35,608 tons of iron-oxide pigments valued at \$26 million; in 1982, 31,000 tons valued at \$29.3 million; and in 1983, 33,000 tons valued at \$33.3 million.

Natural gas liquids

Natural gas liquids include ethane, propane, isobutane, unsplit butane, and a combination of gasoline and liquefied petroleum gas (LPG). Natural gas liquids were processed in Douglas County at the Tuscola plant of the United States Industrial Chemical Company, a division of National Distillers and Chemical Corporation.

Expanded perlite

Crude perlite mined outside the state was processed by three companies: Silbrico Corporation in Cook County, Strong-Lite Products Corporation of Illinois in De Kalb County, and Johns-Manville Sales Corporation in Will County. In sales of expanded perlite, Illinois ranked second in 1982, following California. Both the quantity and the value of sales have been dropping for the last few years because of the depressed state of the construction industry.

In 1983, however, quantity increased 16 percent, and value increased 27 percent, relative to the 1982 figures. Expanded perlite is used primarily as roof insulation board and for horticultural purposes. Other uses include aggregate for concrete and plaster, for low-temperature insulation, and filters.

Pig iron and raw steel

Pig iron production in Illinois fell from 4.5 million tons in 1981 to 1.3 million tons in 1982, but recovered up to 2.7 million tons in 1983. In each year, the total value of pig iron produced was \$929 million, \$449 million, and \$512 million, respectively. In 1983, Illinois ranked fifth of 13 states in shipments of pig iron. Due to the recession and the surge in foreign steel imports, the iron and steel industry has been through a difficult period. Companies asked for and received concessions from union workers, cut salaries of management and nonunion workers, closed some plants, and laid off some employees in an attempt to restructure and cut costs.

According to the American Iron and Steel Institute in Washington, DC, Illinois production of raw steel was 5.4 million tons (6.4 percent of the United States output) in 1983, an increase of 6.3 percent over 1982 but down 44.5 percent from the 1981 level of 9.1 million tons.

Slag (iron and steel)

Illinois ranked fifth nationally in the production of processed iron and steel slag. Four companies processed steel

slag and two companies produced air-cooled blast furnace slag. Primary use was for construction aggregate. Because of the recession in the construction industry, sales declined 9 percent between 1981 and 1982; however, sales increased 13 percent in 1983 because of renewed construction activity.

Recovered elemental sulfur

Elemental sulfur was recovered in five counties in 1983, as compared with seven counties in 1982. The Natural Gas Pipeline Company of America in Fayette and Kankakee Counties, and Texaco, Inc. in Will County, did not report production. Illinois ranked sixth in the nation in 1983, selling 214,522 tons of sulfur at a value of \$21 million. The amount of sulfur recovered as a byproduct of oil refinery operations was 224,522 tons in 1983, as compared with 213,890 tons in 1982 and 216,077 tons in 1981.

Exfoliated vermiculite

Three companies in De Kalb, Du Page, and Macoupin Counties produce exfoliated vermiculite, which is processed from crude vermiculite mixed outside the state. In De Kalb, the former Mica Pellets, Inc. is now Strong-Lite Products Corporation of Illinois. Illinois ranked seventh in sales of exfoliated vermiculite. The processed exfoliated vermiculite was used as follows:

	1981 (%)	1982 (%)	1983 (%)
Loose-fill insulation	26.9	33.1	40.4
Block insulation	9.7	2.6	12.9
Concrete aggregate	9.3	17.3	15.1
Horticultural and agricultural	26.5	17.3	4.4
Plaster aggregates, steel mills, and fireproofing	27.6	29.7	27.2

The quantity of exfoliated vermiculite processed decreased 23.8 percent in 1982 and 5.1 percent in 1983. The average value per ton decreased at first about 1 percent from 1981 to 1982 but increased about 18 percent in 1982.

Primary slab zinc

Special high-grade zinc from domestic and foreign ores and concentrates were processed by Amax Zinc Company, Inc. in St. Clair County. Six states, including Illinois, accounted for the smelter production of primary slab zinc in 1981, 1982, and 1983.

Secondary slab zinc

During 1981 and 1982, secondary slab zinc was produced at 14 plants in 10 states, but in 1983, it was only produced at 10 plants in 7 states. Two plants are located in Illinois: the Illinois Smelting and Refining Company in Cook County and the New Jersey Zinc Company in Bureau County. Both plants reported production in 1981 and

TABLE 26. Production and value of finished portland cement manufactured in Illinois, 1981-83^a

	1981	1982	1983	Change (%)	
				1981-82	1982-1983
No. of active plants	4.	4.	4.	--	--
Production (tons)	1,701,207	1,544,154	1,888,713	- 9.23	+22.31
Shipments from mills					
Quantity (tons)	1,573,750	1,757,270	1,857,430	+11.66	+ 5.70
Value	61,536,383	78,444,165	74,975,215	+27.48	- 4.42
Average value/ton	39.10	44.64	40.37	+14.17	- 9.57
Stocks at mills, Dec. 31 (tons)	360,618	198,208	229,000	-45.04	+15.54

^asource: U.S. Bureau of Mines.

1982 but not in 1983. Production data for individual states are not available.

MINERAL PRODUCTS MANUFACTURED

In 1981, 1982, and 1983, cement, clay products, coke, glass, and lime were manufactured from crude mineral materials mined both in and out of state.

Cement

Production Raw materials used to manufacture cement include cement rock (an argillaceous limestone containing lime, silica, alumina, and magnesia), limestone, clay, shale, sand, fly ash, slag, and gypsum.

In 1981, four companies produced cement in Illinois: Centex Corporation and Gulf and Western Cement Manufacturing Company in La Salle County; Lone Star Industries in Lee County; and Missouri Portland Cement Company in Massac County. In 1982, three companies at four plants produced cement. Lone Star purchased Gulf and Western Cement Manufacturing; the other plants remained the same. No changes were reported in 1983.

Cement production declined 3.8 percent in 1981 and 9.2 percent in 1982 to a low 1.5 million tons, but increased 22.3 percent in 1983 to 1.9 million tons. Differences in shipments were adjusted through stockpile variations. The value (per ton) of cement declined more than 14 percent in 1981 but recovered, increasing by the same percentage in 1982; however, the value decreased about 10 percent in 1983 (table 26). Prepared masonry production increased 17 percent in 1981; however, production decreased about 27 percent in 1982 and a further 4 percent in 1983.

The shipments of prepared masonry cement increased by 1.2 percent in quantity but decreased 8.5 percent in value in 1981. In 1982, shipments decreased 15.5 percent, and value decreased 22.4 percent; and in 1983, each decreased about 3.5 percent.

Bulk shipments of cement from Illinois plants to customers were made by truck (92% in 1981, 96% in 1982,

and 99% in 1983), rail, and barge. Container shipments of cement were made mainly by truck.

Consumption A total of about 2.3 million tons of portland cement were consumed in Illinois in each of the years 1981, 1982, and 1983 (fig. 13). Consumption of masonry cement in Illinois declined from 90,000 tons in 1980 to 70,000 tons in 1981 and to 54,000 tons in 1982 (40% in 2 years, indicating the slowdown in construction activity), but recovered to 64,000 tons in 1983.

Clay products

To obtain accurate, current information about the amount and value of clay products manufactured in the state, the Illinois State Geological Survey sends questionnaires every year to all producers. Plant closings continued in 1981, 1982, and 1983; some plants were sold and a few did not respond to our questionnaire. Therefore, the reported value fluctuated from \$80.7 million in 1981 to \$57.1 million in 1982 and \$61 million in 1983.

Whiteware and pottery declined sharply from \$41.8 million in 1981 to \$23.8 million in 1982, but recovered slightly to \$27.7 million in 1983. Structural clay products such as common and face brick, drain tile, and sewer pipes declined to \$8.7 million in 1983 from \$9.8 million in 1982 and \$15.3 million in 1981. Refractories and other products were valued at \$24.6 million in 1983 and \$23.5 million in 1982, down sharply from \$31.6 million in 1981. Companies reporting clay mining operations numbered six in 1981, five in 1982, and four in 1983.

According to the U.S. Department of Commerce, Illinois produced 67.2 million bricks (common and face) and shipped 49.7 million with a value of \$7.0 million in 1981. In 1982, Illinois produced 51.8 million bricks and shipped 55.1 million (an 11.1% increase over 1981) with a value of \$6.1 million. The brick manufacturers appear to maintain substantial inventories from year to year in order to accommodate fluctuations in demand.

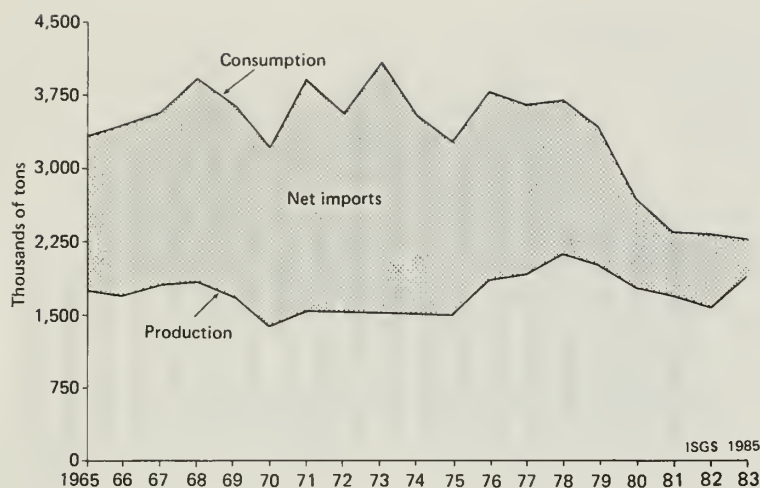


Figure 13 Production and consumption of finished portland cement in Illinois, 1965-83.

TABLE 27. Coke production, coal carbonized, coal used and value, 1978-83^a

Year	Coke production (1000 tons)	Coal carbonized (1000 tons)	Coal receipts at coke plants (1000 tons)	Average price of coal receipts at coke plants (\$/short ton)
1978	1,431	2,255	1,638	49.71
1979	1,364	2,210	2,154	48.96
1980	1,155	1,811	1,684	51.75
1981	1,170	1,731	1,755	56.10
1982	1,175	1,764	1,723	59.79
1983	1,359	2,028	2,068	56.63

^asource: U.S. Department of Energy.

Coke

Production Coke production in Illinois did not change significantly during the 1980-83 period. After the decline in 1979 and 1980, the depressed state of the steel industry kept coke production at just under 1.2 million tons per year; it increased to 1.36 million tons per year in 1983 (table 27). The difference between coal received and coal carbonized is explained by changes in coal stockpiled at the coke plants. The value of coal received continued to increase in 1981 (+8.4%) and 1982 (+6.6%), but decreased in 1983 (-5.3%). The average 1983 value was \$56.63 per ton. The U.S. Department of Energy no longer provides data on byproducts on a state-by-state basis.

Consumption and uses Coke is used for production of pig iron, for foundry and other industrial purposes, and for residential heating. Coke breeze was used for fuel in steam plants, in agglomerating plants, and elsewhere. However, data on coke breeze are no longer available.

Glass

Glass and/or fiberglass was manufactured in Du Page, Lake, La Salle, Logan, McLean, Macon, Madison, Marion,

Montgomery, St. Clair, and Will Counties. Production data are not available.

Lime

Production In lime output for 1983, Illinois ranked 7 of 39 states. The data cannot be revealed; however, lime production increased 20.4 percent in quantity and 29 percent in value in 1981, declined 36.8 percent in quantity and 56.5 percent in value in 1982, and recovered to 18.41 percent in quantity and 17.8 percent in value in 1983. Both quicklime and hydrated lime continued to be produced at two plants operated by the Marblehead Lime Company, a division of General Dynamics. Vulcan Materials Company (McCook) also produced quicklime. All three plants are in Cook County.

Marblehead's South Chicago plant ranked seventh in the United States in output.

Consumption and uses Illinois consumed 586,000 tons of lime in 1982 (32% less than 1981) and 664,000 tons in 1983 (13.3% more than 1982) (fig. 14). Illinois was again one of the leading hydrate-consuming states in 1981, 1982, and 1983. A main chemical and industrial use of lime is

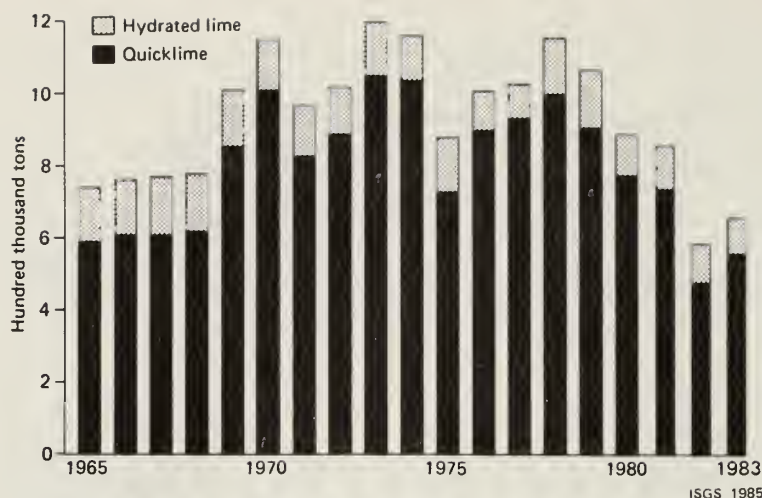


Figure 14 Trends in consumption of quicklime and hydrated lime, 1965-83.

for basic oxygen furnace (BOF) steel. Illinois and Indiana supplied 19 percent of this line in 1981, 31 percent in 1982, and 30 percent in 1983.

PRELIMINARY PRODUCTION DATA, 1984

The leading mineral commodities in Illinois continue to be coal, crude oil, and natural gas; total production value of these fuels has been estimated at \$2,731.3 million for 1984. The U.S. Bureau of Mines provided an estimate of \$315.5 million for the production value of the state's nonfuel minerals, which include stone, sand and gravel, clays, fluorspar, tripoli, lead, zinc, silver, peat, gemstone, and barite.

MINERAL MATERIALS MINED

Data for 1984 indicate the total value of materials mined was about \$3.05 billion—a 6.3 percent increase from the 1983 level (table 28). In general, production of all commodities increased. Nonfuel materials were up 5.5 percent over the previous year. Although nonfuel production was still lower than the peak year of 1979, the upturn in 1984 indicated gains in housing construction and manufacturing, which resulted in increased sales for several nonmetallic mineral commodities.

Fuels

The mineral fuels were valued at about \$2.73 million; approximately 70 percent was contributed by coal. Most of the remaining 30 percent of fuel value was contributed by crude oil. The value of mineral fuels produced in 1984 was up 6.4 percent from the previous year.

Coal

Illinois coal production increased 13.3 percent to 66.2 million tons in 1984, breaking a record set in 1945. Although the value of coal per ton decreased by 1.3 percent from the 1983 level to an estimated \$29.00, total coal

value was up 11.9 percent. The increase in production was due to the increase in shipments to all consuming sectors; this is evident from the data for the first 9 months of the year (table 29). Shipments to other states also increased during the first 9 months of 1984 (table 30); however, exports to other countries declined drastically.

Coal news

- 16 Illinois counties have been selected to receive \$11.5 million in federal grants to reclaim land damaged by surface mining. Reclamation work is scheduled to begin soon in Adams, Bureau, Fulton, Gallatin, Grundy, Jackson, La Salle, Macoupin, Perry, Peoria, Putnam, Randolph, Sangamon, St. Clair, Vermilion, and Williamson Counties.

- the Illinois Central Gulf Railroad (ICG), which shipped about 300,000 tons of export coal from Illinois Basin mines in 1980, predicts that by 1987 it will move 5 million tons of coal per year from the region to ports in New Orleans, Baton Rouge, and Mobile.

- the state's first permanent mining permit has been issued to the largest coal-producing mine in Illinois: Southwestern Illinois Coal's (now Arch of Illinois) Captain Mine near Percy.

- Zeigler Coal Company of Des Plaines, Illinois, a subsidiary of Houston Natural Gas Corporation, has been acquired by senior managers at Zeigler. Zeigler has more than 140 million tons of coal reserves and a production capacity of 5 million tons. It is not known whether the new owners endorse the old plan to expand the company's Murdock mine preparation plant in Douglas County.

- Freeman United Coal Company closed its No. 3 Mine in Jefferson County.

- the B. F. Goodrich Company and Illinois have agreed to build the nation's first industrial boiler designed to use fluidized-bed combustion technology. The objective is to burn high-sulfur Illinois coal yet meet environmental standards. The \$21.3 million pilot project will be located at Goodrich's Illinois chemical plant in Marshall County.

- the Lauhoff Grain Company at Danville has plans on the drawing board to make itself relatively energy-independent by building a coal-fired facility to generate electricity and steam. However, this would probably result in higher electricity charges for other customers of Illinois Power Company as Lauhoff accounts for about 15 percent of the electricity and 22 percent of the natural gas consumed in the Danville service region of Illinois Power.

Crude oil and natural gas

In 1984 crude oil production is estimated to have decreased 1.1 percent to 28.9 million barrels. At an estimated value of \$28 per barrel, the 1984 production was worth about \$808 million. Oil prices per barrel have declined from 1983 to 1984 by about 3.7 percent.

From 1983 to 1984, natural gas production increased by 50.1 percent and value increased 46.6 percent. The unit value decreased 2.5 percent from \$2.84 per million cubic feet in 1983 to \$2.77 per million cubic feet in 1984. This increase was due in part to a new field in Pike County and to increased production in Saline, Coles, and Williamson Counties.

Industrial and construction materials

Preliminary data for 1984 show that the total value for industrial and construction materials increased 4.4 percent

over 1983. The values of fluorspar, tripoli, stone, sand and gravel increased, while clay decreased. Stone and sand and gravel continued to contribute the greatest amount of value to the state's nonfuel mineral production.

News

- In the fluorspar district, Ozark-Mahoning started shaft sinking in August 1983, at the new Annabel Lee mine complex located approximately 8 miles north of Cave-in-Rock and 1/2 mile west of U.S. Route 1, and completed it in March 1984. The mine will begin production in 1985. In this area, Ozark-Mahoning operates several mines producing both acid and metallurgical-grade fluorspar.

- the Illinois Central Gulf Railroad abandoned its 16.3-mile spur line from Reevesville to Rosiclare during the year, leaving the state's fluorspar industry to find alternate means of transportation.

- for economic reasons, Inverness Mining Company closed its underground mining operation in April and began processing fluorspar imported from South Africa and Mexico.

- the industrial sand operations in Oregon and Troy Grove owned by Martin Marietta Corporation were sold to Unimin Corporation. The industrial sand facilities at Wedron were sold in July 1984 to Wedron Silica Company.

- one of the state's two producers of tripoli, Illinois Minerals Company, was purchased by Georgia Kaolin

TABLE 28. Mineral production data for 1983 and preliminary 1984

Commodity	Unit	1983		1984		1983-84 change (%)	
		Quantity	Value (\$1000)	Quantity	Value (\$1000)	Quantity	Value
MINERAL MATERIALS MINED							
Fuels							
Coal	thousand tons	58,374	\$1,714,432	66,158	1,918,600 ^a	+ 13.3	+ 11.9
Crude oil	thousand bbl	29,200	849,137	28,870	808,400 ^a	- 1.1	- 4.8
Natural gas	million cu ft	1,030	2,926	1,546	4,282 ^a	+ 50.1	+ 46.6
Industrial and construction materials							
Stone	thousand tons	42,763	166,931	45,100	172,000	+ 5.5	+ 3.0
Sand and gravel	thousand tons	25,160	101,271	25,630	109,940	+ 1.9	+ 8.6
Clays ^b	thousand tons	717	3,360	251	1,018	- 65.0	- 69.7
Fluorspar	thousand tons	W	W	W	W	+ 14.0	+ 18.8
Tripoli	thousand tons	W	W	W	W	+ 0.2	- 14.7
Metals							
Lead	tons	W	W	W	W	- 0.6	+ 14.6
Zinc	tons	W	W	W	W	+138.9	+176.9
Silver	troy oz	W	W	W	W	- 0.5	- 4.3
Other							
Peat	thousand tons	W	W	W	W	+ 2.6	+ 0.8
Gem stones		NA	15	--	15	--	--
Barite, primary	thousand tons	W	W	W	W	+ 33.3	+ 51.0
Values that cannot be disclosed (W)							
		-	27,471		32,556	--	+ 18.5
Total value of mineral materials mined							
			\$2,865,543		3,046,796		+ 6.3

^a estimated by Illinois State Geological Survey.

^b excludes fuller's earth; included with value of items indicated by symbol W.

W = withheld to avoid disclosing the confidential data of individual companies.

TABLE 29. Coal shipments from Illinois to consuming sectors in the United States, 1982-84^a (1000 tons)

Consuming Sector	1982 Jan.-Sept.	1983 Jan.-Sept.	1984 Jan.-Sept.	1982-1983 change (%)	1983-1984 (change (%))
Electric utilities	40,207	37,909	43,771	- 5.7	+15.5
Coke and gas plant	1,799	1,828	2,036	+ 1.6	+11.4
Retail dealers	190	251	336	+32.1	+33.9
All others	3,323	3,352	3,844	+ 0.9	+14.7
Transportation	5	--	--	--	--
Used at mine	--	2	--	--	--
Mine stock (adjusted)	--	--	--	--	--
Foreign	294	235	18	-20.1	-92.3
Total	45,817	43,577	50,006d	- 4.9	+14.8

^asource: U.S. Department of Energy, Coal Distribution, January-September, 1982; 1983, and 1984.

TABLE 30. Coal shipments from Illinois to consuming states, 1982-84^a (1000 unit tons).

Consuming Sector	1982 Jan.-Sept.	1983 Jan.-Sept.	1984 Jan.-Sept.	1982-1983 change (%)	1983-1984 (change (%))
Illinois	14,712	14,093	16,621	- 4.2	+17.9
Missouri	11,466	11,595	13,563	+ 1.1	+17.0
Indiana	7,179	6,314	8,656	-12.0	+37.1
Wisconsin	2,628	2,816	2,656	+ 7.2	- 5.7
Georgia	2,378	2,365	2,383	- 0.5	+ 0.8
Iowa	2,008	1,971	1,571	- 1.8	-20.3
Alabama	1,742	1,765	1,678	+ 1.3	- 4.9
Florida	1,464	1,076	1,449	-26.5	+34.7
Minnesota	525	376	163	-28.4	-56.6
Other states ^b	1,421	971	1,248	-31.7	+28.5
Exports	294	235	18	-20.1	-92.3
Total	45,817	43,577	50,006	- 4.9	+14.8

^asource: U.S. Department of Energy, Coal Distribution, January-September, 1982, 1983, and 1984.

^bPennsylvania, Michigan, Kansas, Kentucky, Mississippi, Tennessee, Louisiana, Texas, California, New York, Ohio (1984), South Carolina (1984), includes coal used at mines and net change in mine inventory.

Company of New Jersey. The firm will continue to operate under the same name. Georgia Kaolin has also opened a new surface mining operation in Alexander County during the year.

Metals and other minerals

Lead, zinc, barite, and small amounts of silver were recovered as byproducts of Illinois fluorspar production in 1984. The total 1984 value of metals mined is estimated to have increased considerably over that of the 1983 value; the value of barite increased 51 percent in 1984 from the 1983 value.

Gould Inc. of Rolling Meadows, Illinois, signed a definitive agreement for the sale of its lead-acid battery operations, GNB Batteries Inc., to a group of private investors. The battery operations include 21 facilities, among them the firm's secondary lead smelter in Savanna, Illinois.

Illinois continued to rank fourth in the nation in peat production in 1984. The fluorspar gemstone mined in southern Illinois continued to contribute approximately \$15,000 to the total value of mineral materials mined.

MINERAL MATERIALS PROCESSED

Preliminary data for 1984 are not yet available for most of the mineral materials processed in Illinois. The American Iron and Steel Institute reported that Illinois raw steel production increased from 5,410,000 net tons in 1983 to an estimated 6,471,142 net tons in 1984, a 19.6 percent increase. Even though raw steel production increased in 1983 and 1984, it still remained below the average production of recent years. Most steel companies continued to report losses on their steel operations because of low sales and depressed prices. While demand for steel by manufacturers of consumer goods such as automobiles and appliances increased, demand for steel for capital goods remained weak. Steel imports continue to be a concern to domestic producers.

MINERAL PRODUCTS MANUFACTURED

Preliminary figures for portland cement show that 2 million tons were manufactured in 1984—a 13.1 percent increase over 1983. The 1984 value was \$85.7 million—a 14.3 percent increase over 1983. Masonry cement decreased 16.7 percent in quantity and 13 percent in value from 1983.

